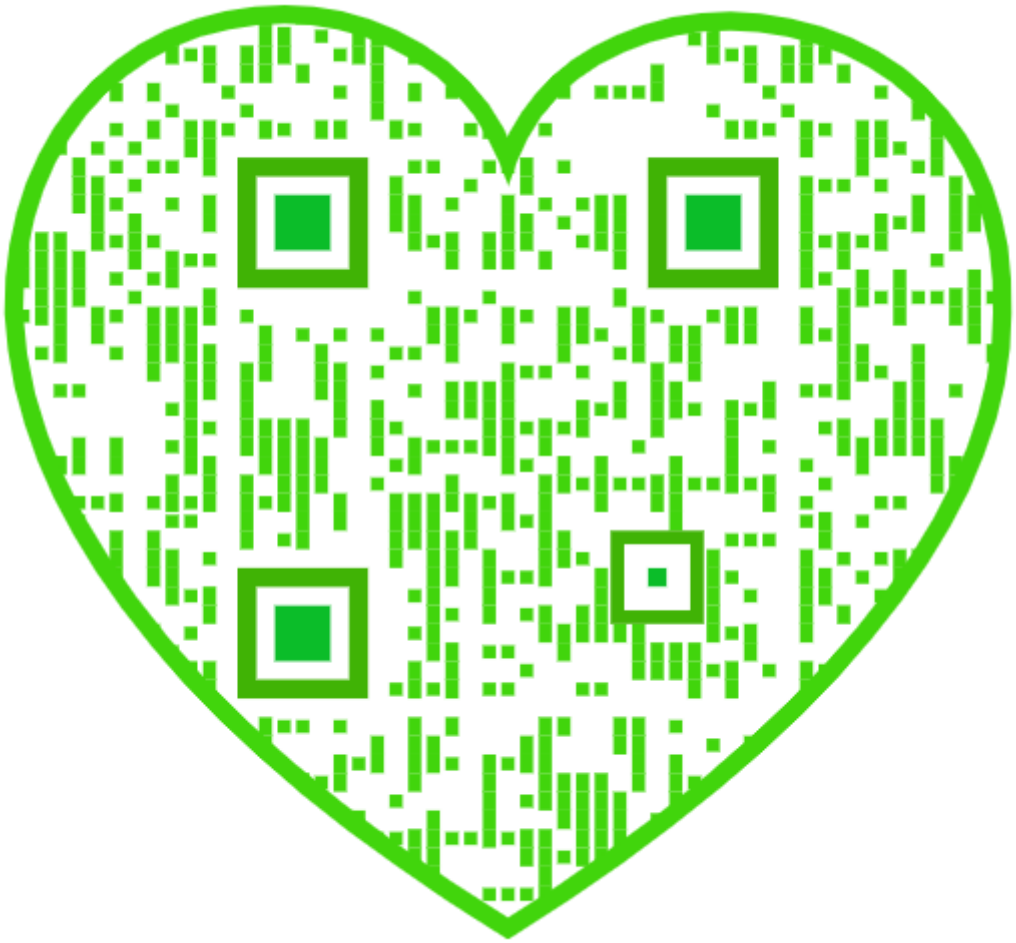
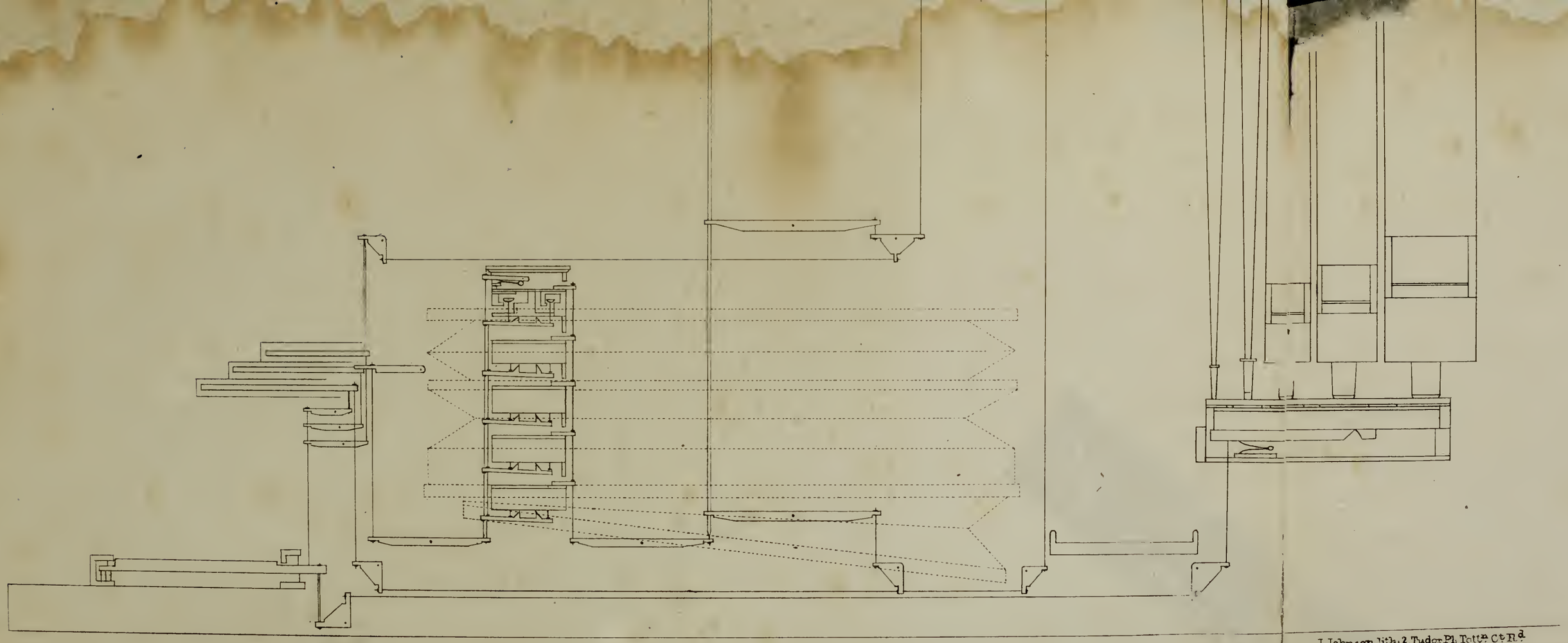


THE ORGAN;

ITS HISTORY AND CONSTRUCTION.



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GENERAL SECTION OF AN ORGAN,

SHOWING THE SOUND-BOARDS AND STOPS IN PROFILE, AND THE PNEUMATIC KEY MOVEMENT.

Designed for Hopkins & Rimbault

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1855

THE ORGAN,

ITS HISTORY AND CONSTRUCTION:

A COMPREHENSIVE TREATISE

ON THE

STRUCTURE AND CAPABILITIES OF THE ORGAN,

WITH SPECIFICATIONS AND SUGGESTIVE DETAILS FOR INSTRUMENTS OF ALL SIZES,

INTENDED AS A

HANDBOOK FOR THE ORGANIST AND THE AMATEUR,

BY

EDWARD J. HOPKINS,

ORGANIST OF THE TEMPLE CHURCH;

PRECEDED BY AN ENTIRELY

NEW HISTORY OF THE ORGAN,

MEMOIRS OF THE MOST EMINENT BUILDERS OF THE SEVENTEENTH AND EIGHTEENTH CENTURIES,
AND OTHER MATTERS OF RESEARCH IN CONNECTION WITH THE SUBJECT

BY

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PREFACE.

The following work has been undertaken with the view of supplying what has hitherto been felt to be a great desideratum in this country; namely, a hand-book describing the construction of the English Organ with the necessary minuteness to enable those not previously conversant with the subject to understand the formation, nature, and operation of every part of that most ingenious, complex, and noble of all Musical Instruments. In proceeding to carry out this design, several plans presented themselves; but the one that appeared best calculated to place the subject in the most simple shape before the reader, was that of arranging the various systems of mechanism, and the several clever devices for giving speech and vitality to the Organ, into separate divisions, and then of describing the numerous parts which together form those main portions, in the continuous order they are usually met with in modern English instruments. This course has therefore been adopted in the arrangement of the materials forming the following chapters; and each separate subject—as, for instance, some particular system of mechanism—is traced from its source to its termination, with a slight notice only (at the time) being taken of other portions of the intricate machine towards which it may occasionally approach closely, yet without having therewith any actual connection.

The endeavour has been made, in the progress of the work, to record the names of the originators of the numerous ameliorations and improvements that have been made from time to time in the details of Organ-building. This part of the design, however, has not been found by any means so easy of accomplishment as at first it might appear to be; for but few records were ever kept either of the date or the builder by whom such advantageous modifications were effected. An internal examination of numerous Organs, and a comparison of their dates of construction have been made, with the view of arriving at a correct conclusion on all these points, and the result has been given: at the same time, a date or fact may here or there have escaped the research of the writer, who will therefore be glad to receive any such testimony as may come under the notice of others, and which will be gratefully accepted and carefully preserved for future use. To account for the frequent appearance of names and dates in the descriptions of some of the more recent improvements, it may be mentioned that these have in all cases been given, where positively known, in the hope of obviating future uncertainty.

Among the most vexed questions of the present time regarding the English Organ, are those relating to the compass and the temperament of the instrument. To each of these subjects, therefore, a full chapter has been devoted, which, it is hoped, may have some influence in conducting them nearer towards a settlement. In these discussions, and indeed throughout the work, great pains have been taken to preserve as much simplicity of language and freedom from technicality as seemed practicable. Other matters of importance are those relating to the musical pitch, the composition of the compound stops, and the position of the Organ; all of which have also been considered at some length.

The Appendix will be found to present a collection of specifications of British and Foreign Organs, more varied in size and details, and more extensive in number, than has ever before been brought together in any similar work in any country. A few of the English specimens are either accounts of instruments of past celebrity, or of such as were made according to a system now being fast superseded; but most of the continental descriptions, it is confidently hoped, will prove of the highest value to Organists, in exemplifying what are the general principles observed by the foreign artists, to the investigation of which the Organ-builders and Organists of this country, fortunately, are now almost universally turning their attention. The accounts of Foreign Organs have partly been prepared from notes made by the writer and other tourists at the instruments themselves, and partly from previously printed accounts; the stops, however, being in all cases re-arranged and classified according to one uniform and simple plan, so that they may be more convenient for purposes of reference and comparison. The descriptions of British Organs have been drawn up, in some cases, from accounts kindly furnished by their respective Organists; in others, from well-known printed authorities; while the particulars of the more recently constructed instruments have been extracted chiefly from the descriptions issued by their respective builders.

It remains for the writer to tender his thanks to those gentlemen who have kindly favoured him with their suggestions and opinions; and he feels his acknowledgments to be particularly due to Mr. Hill and Mr. Walker, Mr. Robson and Mr. Jardine, for their exposition of certain technical matters; and to the Rev. Sir Frederic Gore Ousely, Bart. and to C. Harwood Clark, Esq. for placing their MS. note-books, containing accounts of numerous Foreign Organs, so entirely at his disposal.

EDWARD J. HOPKINS.

69, Tachbrook Street, Pimlico.
June, 1855.

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IN "THE CONSTRUCTION OF THE ORGAN," &c.

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17, last line but one, after *influence of*, read *the*.
18, Sec. 71, last line but one, instead of *by a*, read *by the*.
32, the position of the two wood-cuts should be reversed.
33, Sec. 137, last line, after *series*, read *with Pipes above*.
50, Sec. 222, fourth line from the end, for *roller*, read *rollers*.
56, Sec. 240, fifth line, for *doubler*, read *double*.
58, Sec. 243, for *fig*. read *figs*.
58, Sec. 243, eighth line, for *m* read *w*, and for *t* read *f*.
59, Sec. 245, fifth line, for *n* read *g*; and in seventh line, for *q* read *p*.
60, Sec. 247, fourth line, for *pallet* read *pallets*.
83, second line, for *second* read *sound*.
84, Sec. 362, for *thus* read *then*.
86, Sec. 372, third line, for *i* read *o*.
— Sec. 374, the *comma* should be after the word *outside* in the sixth line, and not after *exterior* in the seventh.
— Sec. 375, fourth line, for *it is*, read *they are*.
109, Sec. 495, the misprints, "Principal-werk, Gedact-werk, and Flote-werk," should be erased.
120, Sec. 569, second line, for "$1\frac{1}{6}$ foot on the Manual, and $2\frac{1}{3}$ on the Pedal," read $1\frac{1}{3}$ foot on the Manual, and $2\frac{2}{3}$ feet on the Pedal.
158, Sec. 709, fourth line, for *of third*, read *of a third*.
164, Sec. 737, fifth line, for *lower*, read *low*.
166, Sec. 742, fifteenth line, for "practised *E la*," read "practised above *E la*."
———— eighth line, the punctuation should be erased.
173, Note, fourth line, for *Stop*, read *Stops*.
186, Sec. 822, fourth line from the bottom, for "disturbing," read "permanently disturbing."
204, Sec. 889, last line but two, for *iu* read *in*.
208, Sec. 903 (side note), for *writing* read *uniting*.
263, Sec. 1105, second line, for $2\frac{1}{2}$ inches, read $2\frac{3}{8}$ inches.
— Sec. 1109, first line, after "short," insert "in front of the centre."
269, Sec. 1142, third line, for $\frac{1}{16}$, read $\frac{3}{16}$.
283, Sec. 1196, thirteenth line, after "plugging," insert "making a wider wind-way."
284, Sec. 1198, second line, for Diapasons, read Diapason.
288, Sec. 1212, last line, for *notes*, read *note*.
300, Sec. 1237, fourth line from the bottom, for "$5\frac{2}{3}$ feet," read "$5\frac{1}{3}$ feet."
313, Sec. 1269, last line but one, for "point," read "points."
315, Stop No. 11, for "$1\frac{3}{8}$ feet," read "$1\frac{3}{5}$ foot."
317, No. 3, second line, for "and Pedal," read "and a Pedal."
318, Stop No. 11, for "1 feet," read "16 feet."
321, No. 7, Stop No. 50, for "3 feet," read "4 feet."
322, No. 8, last line but two, for "Fuur," read "Four."
———— last line, for "altissimo," read "alt."
325, No. 12, fifth line, for "Bourbordes," read "Bombardes."
332, No. 17, last line, for "5^3 feet," read "$5\frac{1}{3}$ feet."
335, No. 20, Stop No. 12, for "$1\frac{2}{5}$ foot," read "$1\frac{3}{5}$ foot."
342, No. 29, second line, for "that," read "the."
343, No. 31, Stop No. 19, for "3 feet," read "2 feet."
345, Stop No. 21, for "$1\frac{1}{2}$ foot," read "$1\frac{1}{3}$ foot."
361, Stop No. 57, for "$6\frac{2}{3}$ feet," read "$6\frac{2}{5}$ feet."
— No. 57, Stop No. 11, for "$1\frac{1}{2}$ foot," read "$1\frac{1}{3}$ foot."
365, Stop No. 23, for "2_2," read "$2\frac{2}{3}$."
377, No. 74, Stop No. 11, for "$1\frac{2}{3}$," read "$1\frac{1}{3}$."
379, No. 77, after Stop 46, instead of "5, 6, and 7," read "44, 45, and 46."
388, No. 88, Stop No. 13, for "$3\frac{1}{3}$ feet," read "$3\frac{1}{5}$ feet."
389, No. 88, Stop No. 20, for "$1\frac{2}{3}$ foot," read "$1\frac{1}{3}$ foot."
399, No. 107, second line, for "name," read "names."
469, No. 174, there is a Bourdon on the Pedal of the Exeter Hall Organ, making the number of Sounding Stops 42 instead of 41.
495, No. 212. The Glouecster Shire Hall has, in the Great Organ, a IV-rank Sesquialtera and no Viol di Gamba; in the Choir, a Suabe Flute and no Fifteenth; and in the Swell, a Gamba and no Cromorne. It has also 14 Accessory Stops and Movements; namely, 6 Couplers and 8 Composition Pedals.

AN HISTORICAL ACCOUNT

OF

THE ORGAN,

BY

EDWARD F. RIMBAULT, LL.D.

&c. &c.

PREFACE.

When I undertook to prefix to my friend Mr. Hopkins's valuable treatise on the construction of the Organ an historical account of that noble instrument, my intention was to give a *resumé* of what had already been written, with the addition of such new particulars as the course of years had accumulated in my note-books. But upon collating the various writers, their statements often appeared so vague and unsatisfactory, that it became necessary to consider the subject more attentively, and, in all cases where it could be done, to consult *original* authorities. The result of this examination has been the clearing up of many doubtful points, and the discovery of some important particulars hitherto unknown.

All modern writers have been perplexed with the notices of the Organ handed down to us by the ancient Greeks, and have endeavoured to reconcile them with our present ideas of the instrument. The *key-board* has been a constant source of difficulty, and the epigram, or rather enigma, of the Emperor Julian has been often cited to prove that the ancients were acquainted with it. The discovery of a treatise on Organ-building by a monk of the eleventh century (printed in the following pages) settles for ever this important question.

Another source of difficulty is the common expression, in mediæval times, of "a pair of organs." Some of our ablest antiquaries have exercised their erudition in endeavouring to explain this term; but with what degree of success, the reader who peruses the following pages will have an opportunity of judging.

At a later period in the History of the Organ, the biographies of Smith and Harris have been involved in much obscurity. Father Smith has *fathered* all our *old* organs, of whatever kind or description; and so little attention has been paid to dates, that we are told, "Harris's most celebrated organs are those of St. Sepulchre's, London, 1667, and Doncaster, Yorkshire, 1738!" I have been enabled to arrange the various members of these two celebrated families under their respective periods, and by so doing have cleared away many anachronisms, and reconciled a few seeming impossibilities.

The Jordans and the Byfields, and their foreign cotemporaries the Silbermanns, have also received the same attention; and if the information regarding them is somewhat scant, it is all my research has enabled me to bring together.

The section on the "Ancient Position of the Organ" is interesting at the present time, when architects are anxiously looking for precedents. I have carefully noted all the authorities upon the point, especially in this country;

which, added to Mr. Hopkins's able chapter on the "Situation of the Organ," will, it is to be hoped, be found of some practical utility. The rescue of this noble instrument from the "holes and corners" to which modern ecclesiologists have ofttimes assigned it, is part of our creed.

It will be observed that my historical account deals more with facts than with opinions. For the latter, I am content to refer to the body of the book, trusting with full confidence to Mr. Hopkins's superior judgment and intimate acquaintance with his subject.

The History of the Organ, from the period at which I leave it, chiefly consists in a series of inventions, all of which receive their full share of attention from Mr. Hopkins, in the course of the volume.

I ought not to pass unnoticed the aid I have received from several authors who have written upon the same subject. Amongst them I may especially name the Rev. Sir William Cope's paper on "Early Organ-builders in England," inserted in the *Parish Choir;* Mr. Sutton's *Short Account of Organs built in England from the reign of King Charles the Second to the present time;* Herr Seidel's *Treatise on the Organ,* printed at Breslau; and M. Hamel's valuable reprint of Dom Bedos, forming one of the publications of the *Encyclopédie-Roret.* If I have not named other modern works purporting to treat of the Organ historically, it is because I have found them unworthy of credit.

It only remains to tender my obligations to those gentlemen who have kindly assisted me in the course of the following essay. I must especially thank my friend, F. W. Fairholt, Esq. F.S.A. for the valuable extracts from Mr. Rolfe's MSS. (inserted in p. 45), and for other information; William Chappell, Esq. F.S.A. for two or three curious notices; Mr. Hill, the eminent Organ-builder, for the loan of G. P. England's MS. Account Book; Alfred Price, Esq. of Gloucester, for his MS. translation of Herr Seidel's Treatise on the Organ, before mentioned; and lastly, Robert Hendrie, Esq. for his kindness in giving me permission to use his excellent translation of Theophilus's Chapters on the Organ.

EDWARD F. RIMBAULT.

29, St. Mark's Crescent, Regent's Park,
June, 1855.

ERRATA.

Page

42, sixth line from the bottom, for "may have been," read "was."

56, third line from the bottom, for "*Russian* provinee," read "*Prussian* province."

THE

HISTORY OF THE ORGAN.

FIRST EPOCH.

THE ANCIENT ORGAN, ANTERIOR TO THE INVENTION OF THE KEY-BOARD.

1. *Its Invention.*

THE early history of ancient musical instruments is surrounded by mystery and fable; their invention being usually attributed to the heathen deities. Patient investigation is required to sift the historical from the fabulous matter, and it then remains a matter of doubt whether the result does not excite, rather than satisfy, our curiosity.

The word *organ*, used in the Old Testament and in the Psalms, must not be confounded with the noble instrument now bearing that name. The term was taken from the Greek translation; but the ancient Greeks had no particular musical instrument called an *organ;* for ὄργανον, with them, was a general name for an *instrument*, a *work*, or an *implement* of any kind: hence, ὀργανικός, *instrumental;* ὀργανοποιός, an *instrument maker;* and ὀργανοποιία, the *fabrication* of *an instrument*. And, in all the Greek musical theorists, *organic* is a general term applied to instrumental music*.

It is of much importance to the history of an art, that the origin, etymology, and primitive acceptance of its terms should be minutely traced. In the present instance, the extended application of the word *organum*, throughout the middle ages, has given rise to much confusion and misunderstanding. It is, however, perfectly clear, to those who have investigated the subject, that the Greeks understood by the word ὄργανον, and the Romans by their *organum*, not an *organ*, in our sense of the term, but an instrument of any kind; applying the expression, however, more particularly to musical instruments†.

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* See note in Burney's *History of Music*, vol. i, p. 252; also Liddell and Scott's *Greek and English Lexicon.*

† ORGANUM. A general name given to any instrument, machine, or contrivance by which human labour is assisted, in agriculture, architecture, warfare, &c.; differing, however, from *machina* in this particular, that it required a certain amount of skill from the person using it, whereas that only wanted brute force or numbers to work it. (Vitruvius,

The organ (*ougab*) mentioned in Genesis (chap. iv, v. 21) certainly little resembled the modern instrument of that name, although it may be regarded as furnishing the first hint*. It was probably a series of reeds, of unequal length and thickness, joined together; being nearly identical with the pipe of Pan among the Greeks, or that simple instrument called a *mouth-organ*, which is still in common use†. The classical ancients ascribe its invention to Pan, the great sylvan god; and, accordingly, he was usually figured with the instrument in his hands. The fable states that he formed it of reeds that grew by the river, and caused it to produce all kinds of agreeable sounds, while his goats were skipping around him, and feeding on the banks. This shows that it was regarded as properly a sylvan and pastoral instrument; and so it seems to be mentioned by Job (ch. xxi, v. 11, 12). Pan himself thought it superior to the lyre of Apollo, whom he challenged to a trial of skill; and the challenge being accepted, the umpire (being no other than Midas) decided in favour of Pan's pipes.

The Greek and Latin shepherds made this primitive instrument of strong

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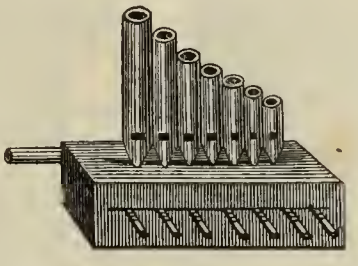
x, 1, 3. Columell, iii, 13, 12. Plin. *H. N.* xix, 20.) Hence the word is especially given to musical instruments (Quint. ix, 4, 10; xi, 3, 20); and, amongst these, more particularly to the one from which our *organ* is descended (Suet. *Nero*, 41. Lamprid. *Alex. Ser.* 27. Id. *Heliog.* 32); but which also had a special name of its own, in allusion to the water originally employed, instead of weights, for working it.—Rich's *Companion to the Latin Dictionary and Greek Lexicon*, p. 458.

* "And here we must not think that the organs in the Old Testament were any such things as those which we call so now. We read it in Job, chap. 30, verse 31, *and my organ into the voice of them that weep.* The Syriack rendreth it, *my psaltery*, clean another instrument of a triangular form, as you may see by the description of *Mersenius* (*De Instrum. Harm.* lib. 10, prop. 44). The Hebrew word in Job is *ougab*, which the Chaldee still turneth *abuba:* now *abub* signifieth properly an ear of corn with the stalk or straw: by translation it signifieth a pipe made of such a reed or stalk, *fistula ex novarum frugum calamo confecta* * * *. David's organ was but a kind of pipe, what kind soever it was."—Gregorie's *Discourse declaring what time the Nicene Creed began to be sung in the Church*, 4to. 1683.

† It is indeed remarkable that the lyre (*kinnor*) and syrinx (*ougab*) were the two first instruments of music the invention of which is recorded in Scripture, and the only ones that are mentioned before the Deluge; and that subsequently the *ougab* is almost always mentioned in connection with the *kinnor*. The principle of the instrument is so simple, that it has been one of the most diffused of musical instruments. A syrinx, or *fistula Panis*, made of reeds tied together, exactly resembling that of the ancients, has been found to be in common use in the island of New Amsterdam, in the South Seas, as flutes and drums have been in Otaheite and New Zealand; which indisputably proves them to be instruments natural to every people in a state of barbarism. They were first used by the Egyptians and Greeks, during the infancy of the musical art among them; and they seem to have been invented and practised at all times by nations remote from each other, and between whom it is hardly possible that there ever could have been the least intercourse or communication. The combination of pipes in question is still used in different parts of Asia. The number of tubes which these instruments exhibit on ancient monuments varies from seven to eleven. See *Burney*, vol. i, p. 267; and the *Pictorial Bible*, vol. ii, p. 665, *note*.

reeds, or some other suitable wood. It originally consisted of seven or eight reeds of progressive lengths, fastened together with wax. The number was afterwards extended to ten or twelve*. The syrinx, or pipe of Pan, by its form and arrangement, may be regarded as the first kind of organ building; for it consisted of a number of pipes placed together in ranks, according to their succession of tones, and sounded by wind.

To obviate the fatiguing motion of the head or hands, by inflating the pipes in some other manner, men seem to have laboured for centuries. The first step towards this end was the invention of a wooden box, the top of which was bored with just so many holes as there were pipes to stand on it. In these they now placed the pipes in the same order as they occupied in the Pan-pipes. From the chest (the modern *wind-chest*) proceeded a small reed (now the *wind-trunk*), into which they blew with the mouth. But as, by this means, all the pipes spoke simultaneously, they were obliged to stop with the fingers the tops of those pipes intended to be silent—a process which was soon found to be very troublesome, and, as the number of pipes increased, impossible. Now, in order to prevent the simultaneous intonation of all the pipes, a slider (now called the *valve*) was placed under the aperture of each pipe, which either opened or stopped the entrance of the wind into the pipes. Father Kircher, in his *Musurgia*, fol. 1650 (lib. ii, p. 53), has given us a drawing of this instrument, which is here copied:



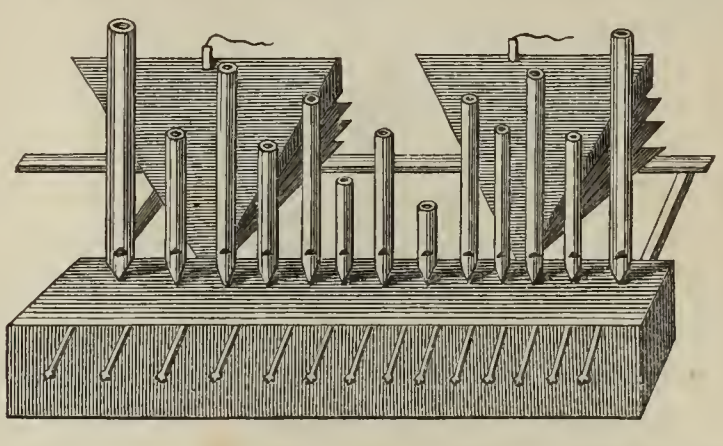
The slides stood in an inclined position, and, in order to open them, levers were added, which were connected with the slides by cords or strings (the origin of the *pull-downs*). A further increase of the number of pipes at length caused an enlargement of the pipe-chest (the modern *wind-chest*); consequently, human breath was no longer sufficient to supply the instrument, and then a more suitable contrivance for the production of wind was devised. Thus we have a new class of instrument, called by the Greeks ὄργανον πνευματικόν, and by the Romans *tibia utricularis*. Virgil has an elegant passage, in which he describes the shepherd Tonius playing upon the *tibia utricularis*:—

"Et cum multifori Tonius cui tibia buxo
Tandem post epulas, et pocula, multicolorem
Ventriculum sumpsit, buccasque inflare rubentes
Incipiens, oculos aperit, ciliisque levatis,

* This instrument is described by Virgil, and the use of it by Lucretius, lib. v. It is frequently depicted upon ancient medals.

Multotiesque alto flatum e pulmonibus haustum
Utrem implet; cubito vocem dat tibia presso,
Nunc huc nunc illuc digito saliente...."

When soberly considered, this instrument appears to be nothing more than the origin of the bagpipe. It consisted of pipes pierced with lateral holes, and an inflating pipe, which the performer applied to his mouth to fill the leathern bag with wind. The application of the inflating tube, it is evident, related only to the smaller instruments, such as that described by Virgil; the larger ones were supplied with wind by the compression of the leathern bag or bellows*. This contrivance proved of so much advantage to the improving instrument, that, in order to obtain a more powerful tone, a second row of pipes of the same pitch was added to the former. The pipes having been thus increased and enlarged, and the box widened, the next improvement was the enlargement of the wind-tube (*trunk*). It now became evident that the leathern bag was insufficient to supply the proper quantity of wind required. The want of wind thus occasioned by the enlargement of the instrument was remedied by the invention of *bellows*, yielding a continuous supply to the leathern bag, which, from this time, served the office of our modern *wind-chest*. Father Kircher's representation of the Hebrew instrument called *Macraphe d'Aruchin*, affords an illustration of an *organ* of this kind:



From the progressive inventions we have recorded, it will be observed that many portions of the modern organ were already to be met with in the instruments of the ancients, in a more or less complete state. We may therefore justly assign the invention of the organ to this period, though no precise date can be given; thus much only can be stated with certainty, that all these inventions date from a period before the birth of Christ.

* M. Fétis has written a long paper to prove that the *Pneumatic Organ* of the ancients was nothing more than a *bagpipe!* This learned writer has, however, been led into an error by considering only a portion of the ancient authorities, i.e. those relating to the *tibia utricularis*. See a translation of M. Fétis' paper in the *Harmonicon* for 1829, p. 4. M. Fétis is, no doubt, correct in saying, "The figure given by Bianchini, of a bagpipe joined to the pipes of an organ (fig. 13, tab. 2), in his Dissertation *De tribus generibus instrumentorum veterum*, is purely imaginary." The passage from Virgil is cited by M. Fétis.

2. *The Hydraulic-Organ.*

Vitruvius, in his celebrated work on Architecture (but treating of other matters very little allied to that art), has left us a curious chapter on the *hydraulic* or *water-organ*, which, from its complicated character, has much puzzled the learned. The *bellows* of the first organs, as we have seen, were very small, and so imperfectly constructed, that they could not supply a steady wind; the organ in consequence did not produce an uniform tone. Thus, the improvement of the wind apparatus was now seriously thought of, and the result was the invention of the *water-organ*.

Vitruvius' description, extracted from his work *de Architectura*, lib. x, cap. xi (translated by Newton), is as follows:

"OF THE HYDRAULIC-ORGANS*.

"I must not omit to discourse briefly, and as explicitly as I am able, on the construction of the hydraulic-organs. Upon a compact base of timber

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* I subjoin the original Latin text:—

"De hydraulicis autem quas habeant ratiocinationes, quam brevissime proximeque attingere potero et scriptura consequi, non prætermittam. De materia compacta basi, arca in ea ex ære fabricata collocatur. Supra basim eriguntur regulæ dextra ac sinistra scalari forma compactæ, quibus includuntur ærei modioli fundulis ambulatilibus ex torno subtiliter subactis, habentibus fixos in medio ferreos ancones, et verticulis cum vectibus conjunctos pellibusque lanatis involutos. Item in summa planitie foramina circiter digitorum ternum, quibus foraminibus proxime in verticulis collocati ærei Delphini, pandentia habentes catenis cymbala ex ore infra foramina modiolorum chalata. Intra arcam, quo loci aqua sustinetur, inest in id genus uti infundibulum inversum, quod super taxilli alti circiter digitorum ternum supposita librant spatium imum, ima inter labra pnigeos et arcæ fundum. Supra autem cerviculum ejus coagmentata arcula sustinet caput machinæ, quæ Græce κανὼν μουσικός appellatur: in cujus longitudine canales si tetrachordos est fiunt quatuor, si hexachordos sex, si octachordos octo. Singulis autem canalibus singula epistomia sunt inclusa, manubriis ferreis collocata: quæ manubria cum torquentur, ex arca patefaciunt nares in canales. Ex canalibus antem canon habet ordinata in transverso foramina respondentia in naribus, quæ sunt in tabula summa, quæ tabula Græce πίναξ dicitur. Inter tabulam et canona regulæ sunt interpositæ ad eumdem modum foratæ et oleo subactæ, ut faciliter impellantur et rursus introrsus reducantur, quæ obturant ea foramina, pleuritidesque† appellantur, quarum itus et reditus, alias obturat, alias aperit terebrationes. Hæ regulæ habent ferrea choragia fixa et juncta cum pinnis, quarum pinnarum tactus motiones efficit regularum. Continentur supra tabulam foramina, quæ ex canalibus habent egressum spiritus. Regulis sunt annuli agglutinati, quibus lingulæ omnium includuntur organorum. E modiolis autem fistulæ sunt continenter conjunctæ ligneis cervicibus, pertingentesque ad nares, quæ sunt in arcula, in quibus axes sunt ex torno subacti et ibi collocati, qui, cum recipit arcula animam, spiritum non patientur obturantes foramina rursus redire. Ita cum vectes extolluntur, ancones deducunt fundos modiolorum ad imum, Delphinique, qui sunt in verticulis inclusi chalantes in os, cymbala replent spatia modiolorum, atque ancones extollentes fundos intra modiolos vehementi pulsus crebritate, et obturantes foramina cymbalis superiora, aera, qui est ibi clausus, pressionibus coactum, in fistulas cogunt, per quas in lignea concurrit, et per ejus cervices in arcam: motione vero vectium vehementiore, spiritus frequens compres-

† Melius forsan *plinthides* a Græc. πλίνθις.

an arca (cistern), made of brass, is disposed; and to the right and left, upon the base, timbers united in the manner of ladders are erected; between these are included brass buckets, with movcable pistons, very carefully turned, and having bent and jointed irons fixed to their middle, with levers adjoined, and being covered with unshorn sheep skins: in the upper surface (of the buckets) are holes of about three digits; near to which holes are brass dolphins fixed on turning joints, and having cymbals hanging by chains from their mouths below the holes of the buckets.

"Within the arca which contains the water is a kind of inverted funnel, under which wedges, of about three digits high, are laid, to level the space between the under lip of the pnigeus and the bottom of the arca. Upon the neck of this (pnigeus) is fixed the little cistern which supports the head of the machine, called by the Greeks *canon musicus*. In the length of this (canon) are channels, in number four if tetrachordic, six if hexachordic, and eight if octachordic. In the several channels are epistomia (stoppers), having iron handles; which handles, when turned, open orifices from the arca (arcula) into the channels. The canon has also holes ranged transversely, communicating with the channels, and corresponding to orifices in the upper table, which in Greek is called *pinax*. Between the table and canon are disposed rulers, which, being perforated in the same manner, and anointed with oil that they may be easily moved to and fro', stop these holes, and are called *pleuritides;* the passing and repassing of which alternately stops and opens the holes.

"These rulers have iron choragia affixed to them, and are united to pinnæ, the touching of which pinnæ causes the motion of the rulers. Upon the table are the holes, through which the air from the channel passes. To the rulers are fixed rings, in which the tongues of all the organic pipes are inclosed. From the buckets proceed tubes, united to the neck of the pnigeus, and communicating with the orifices that are in the arcula; in these tubes are fixed well-turned valves, which, when the arcula has received the air, stop their apertures, and prevent its return.

"Thus, when the handles of the levers are raised, the pistons of the buckets are drawn to the bottom; and the dolphins that are fixed on axes lowering the cymbals that hang from their mouths, the cavities of the buckets become filled (with air). Then the pistons being raised into the buckets again, with frequent and strong pulsations, and thereby causing the cymbals to stop the upper holes, the air, which is there confined, is by the pressure forced into the tubes, from whence it passes into the pnigeus, and through its neck into the arca (arcula); and the frequent motion of the levers still vio-

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sus epistomiorum aperturis influit, et replet anima canales. Itaque cum pinnæ manibus tactæ propellunt et reducunt continenter regulas, alternis obturando foramina, alternis aperiundo, ex musicis artibus multiplicibus modulorum varietatibus sonantes excitant voces. Quantum potui," &c.—*M. Vitruvii Pollionis Architectura.* Utini, 1825-1830, tom. iv, pp. 169 et seqq.

lently compressing the air, it rushes through the apertures of the epistomia, and fills the channel with wind: when, therefore, the pinnæ are touched by the hand, they thrust forward and draw back the rulers, alternately stopping and opening the holes; and thus, by the art of music, sounds in an infinite variety of modulations may be produced.

"I have thus endeavoured to explain, as well as I could by writing, this complex machine; but the construction thereof cannot be easily understood, except by those who are practised in things of this sort: those, however, who understand a little from the description, will, when they see the machine itself, more easily comprehend it, and will find the whole curiously and ingeniously contrived."

From this description, it seems that the water which forced the air into the pipes was pumped by men. Indeed, it has been much disputed whether the instrument was played with *fingers*, by means of levers or *keys*. The latter was impossible, as they were not invented until, perhaps, a *thousand* years afterwards! Yet, it has been remarked, the description of the *hydraulicon* by Claudian seems such a one as would suit a modern organ, only blown by the aid of water:—

"Vel qui magna levi detrudens murmura tactu,
Innumeras voces segetis moderator aënæ;
Intonat erranti digito, penitusque trabali
Vecte laborantes in carmina concitat undas."

Thus Englished by Busby:—

"With flying fingers, as they lightsome bound,
From brazen tubes he draws the pealing sound.
Unnumber'd notes the captive ear surprize,
And swell and thunder as his art he plies:
The beamy bar he heaves! the waters wake!
And liquid lapses liquid music make*.

Kircher in his *Musurgia* (lib. ix, p. 332) has given a lengthy description of the *Vitruvian hydraulicon*, and has accompanied his account by an engraving of the instrument, such as he conceived it to have been from the description handed down to us. Isaac Vossius, in his treatise *De Poematum Cantu et Viribus Rhythmi*, p. 100, gives another fancied representation of the instrument; and a third may be seen in Perrault's† notes upon Vitruvius; but, as all three differ considerably from each other, they cannot be received as authorities.

Burney says, "Neither the description of the Hydraulic-Organ in Vitru-

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* *General Hist. of Mus.* 1819, vol. i, p. 220.

† This author mentions, in his commentary on *Vitruvius*, a method of swelling and diminishing the force of each note in an organ: it is to communicate wind to one pipe, or to two, three, or more pipes, in proportion to the pressure of the key. This method has lately been introduced into the Harmonium.

vius, nor the conjectures of his innumerable commentators, have put it in the power of the moderns either to imitate, or perfectly to conceive the manner of its construction; and it still remains a doubt whether it was ever worthy of the praises which poets have bestowed upon it, or superior to the wretched remains of the invention still to be seen in the grottos of the vineyards, near the city of Rome*."

Athenæus, who flourished in the third century, has left us an account of the *hydraulic-organ*, which is probably the most ancient and authentic extant†. He tells us that it was invented in the time of the second Ptolemy Euergetes, by Ctesibius, a native of Alexandria (B. C. 200), and by profession a barber; or rather that it was improved by him, for Plato furnished the first idea of the *hydraulic-organ*, by inventing a night-clock, which was a *clepsydra*, or water-clock, that played upon flutes the hours of the night at a time when they could not be seen on the index.

The mechanical operation of the *water-organ*, as we have said, is scarcely intelligible; this much, however, is certain, that the *hydraulicon* was provided with pipes and a wind-chest, and registered like the wind-organ. We must not suppose that the water directly produced the wind, but that it served merely to give the wind, by means of counterpressure, equality and power. Ctesibius' object was "to employ a row of pipes of great size, and capable of emitting the most fanciful, as well as the softest sounds." He is also said to have invented, or perfected, the perforated slide, by which means he was enabled to open and shut the mouths of the pipes with greater facility‡.

Instruments of the *hydraulic* kind were made of different sizes, and in different forms. Athenæus, in his chapter on musical instruments, before mentioned, mentions a water-organ small enough to be transported from place to place like the portable hand-organs of the Savoyards. A representation of this instrument is rudely indicated on a contorniate coin of the Emperor Nero, in the collection of antiquities bequeathed to the Vatican by Christiana, Queen of Sweden. It is a medal of Valentinian, showing an organ of eight pipes placed upon a round pedestal. No performer or mode of performing appears; but two figures, one on each side, are engaged in pumping the water by which it is worked§.

Kepler, the celebrated mathematician, had a mean opinion of this instrument. He says, "The water-organ, though it might have registers like the

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* Reflections on the Construction of Musical Instruments, *Hist. of Mus.* i, 491.

† Lib. iv, p. 174.

‡ Dr. Smith's *Dictionary of Greek and Roman Antiquities*, who cites, as authorities, Athenæus, Vitruvius, Drieberg, Brunck's *Anal.* ii, 403, Claud. *de Mall. Theod. Const*, 316, Tertullian's *De Anima*, 14, &c.

§ This coin is engraved in Rich's *Companion to the Latin Dictionary and Greek Lexicon*, p. 342; and in Dr. Smith's *Dictionary of Greek and Roman Antiquities*, p. 503.

wind-organ, was not an admirable invention of the ancients, but mere *bag-piping* !"*

Tertullian, the patriarch, who declares Ctesibius, of Alexandria, to be the *inventor,* and Archimedes the *improver* of the water-organ, expresses himself in the following extravagant terms of eulogy:—"Observe the extraordinary genius of Archimedes: I mean the water-organ; so many members, so many parts, so many joinings, so many roads or passages for the voices, such a compendium of sounds, such an intercourse of modes, such troops of tibiæ, and all composing one great whole! The spirit or air which is breathed out from this engine of water, is administered through the parts, solid in substance, but divided in operation†."

A curious representation of an *hydraulic-organ* is exhibited in a poem by Publilius Optatianus, describing the instrument: it is composed of verses so constructed as to show both the lower part which contained the bellows, the wind-chest which lay upon it, and over this the row of twenty-six pipes. The latter are represented by twenty-six lines, which increase in length each by one letter, until the last line is twice as long as the first‡.

The *hydraulic-organ* was occasionally used down to a comparatively late period. Vossius tells us that, in the French annals of an anonymous writer, he is informed that, in the year 826, a certain Venetian called Georgius, or rather Gregorius, constructed an hydraulic-organ for Louis the Pious, at Aix la Chapelle, and that after the manner of the ancients§.

Dom Bedos, an industrious Benedictine monk, who wrote, about the middle of the eighteenth century, a voluminous work, entitled *L'Art du Facteur des Orgues*‖, cites a very curious passage from the Chronicle of William of Malmesbury, which is thus translated. Speaking of Pope Silvester II (who died in 1003), he says:—"In the church of Rheims are still extant (A. D. 1125), as proofs of his science, a clock constructed on mechanical principles;

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* *Harmonices Mundi*, bk. iii.

† The original passage, cited by Vossius, *De Poematum*, p. 106, is as follows:—"Specta portentosam Archimedis (Ctesibii rectius dixisset) munificientiam: organum hydraulicum dico, tot membra, tot partes, tot campagines, tot itinera vocum, tot compendia sonorum, tot commercia modorum, tot acies tibiarum, et una moles erunt omnia. Spiritus ille qui de tormento aquæ anhelat, per partes administratur, substantia solidus, opera divisus."

‡ Wernsdorf's *Poetae Lat. Min.* vol. ii, p. 394.

§ *De Poematum*, 106.

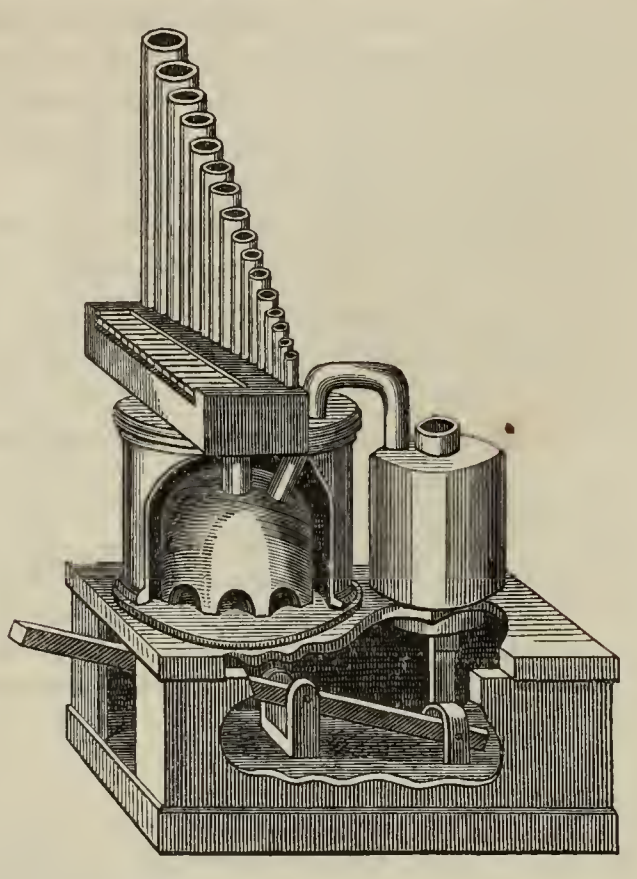
‖ This splendid work, containing 137 plates, was published at Paris in 1766-1778. The author styles himself "Dom Francois Bedos de Celles, Benedicton de la Congrégation de Saint Maur, dans l'Abbaye de Saint Denys en France; de l'Academie Royale des Sciences de Bordeaux, et Correspondant de celle de Paris." He is generally called *Don* Bedos de *Celles.* (Monks in the early ages were styled *Dominus*, afterwards *Domnus*, and finally abbreviated by the French into *Dom.* *Celles* is the name of the place where Bedos was born.) A copy of the original work is preserved in the King's Library, British Museum. It has lately been reprinted at Paris, and forms one of the numbers of the *Encyclopédie-Roret.* Par M. Hamel, 1849; 3 vols. 12mo. and folio.

and an *hydraulic-organ,* in which the air, escaping in a surprising manner, by the force of *heated water,* fills the cavity of the instrument, and the brazen pipes emit modulated tones through the multifarious apertures*."

Mason, commenting on this passage, says, "I here suspect, that by the word *ventus* the monk meant steam; because the sound was produced by hot water, *aquæ calefactæ violentia;* and if so, we have a new purpose, to which the ingenious steam engineers of the present time may, if they please, employ it†."

Dr. Powell, in his curious volume, *Humane Industry, or a History of most Manual Arts,* 12mo. 1661 (p. 109), mentions this instrument, but adds that it was self-acting:—"Pope Sylvester the Second made, in his younger years, a pair of organs that should play without an organist; he used only warm water to give them motion and sound. Such hydraulics are frequent in Italy, that are moved with cold water as well as hot."

A curious representation of an *hydraulic-organ* is given in Häuser's *Kirchenmusik*‡, which seems to illustrate the description of Pope Sylvester's organ. The following is its figure:



* Bohn's edition of *William of Malmesbury*, by Dr. Giles, p. 175.

† *Essays, Historical and Critical, on English Church Music;* York, 1795, p. 35. The original Latin is as follows:—"Aquæ calefactæ violentia ventus emergens implet concavitatem barbiti, et per multiforatiles transitus æneæ fistulæ modulatos clamores emittunt."

‡ *Geschichte des christlichen, insbesondere des evangelischen Kirchengesanges und der Kirchenmusik*, 8vo. Quedlinburg, 1834.

Dr. Powell, in another chapter of the book just referred to (*De Aquaticis Machinis**) gives some curious notices of the water-organs of the seventeenth century. He says, "There are in sundry places of Italy and elsewhere certain *Organa Hydraulica*, that is, Organs that make good Musick of themselves, only by forcing the water up the pipes, and by the collision of the Ayr and Water therein: The lower part of the pipes are placed in the water (as Petrus Victorius describes them), which water being forced up with a scrue, or such device, doth inspire the pipes, as well as the wind that is made with a bellows. Among the water-works in the Duke of Florence his garden, there was an Hydraulic Organ that with the turning of a cock would make sweet harmony, as Mr. Morison relates; the invention is ancient, for *Ammianus Marcellinus* makes mention of one, and *Claudian* describes one thus in his Poem *de Consulatu Mullii Theodori.*

> Et qui magna levi detrudit murmura tactu
> Innumeras voces segetis moderatus Aënæ
> Intonat erranti digito penitusq. trabali
> Vecte, laborantes in carmina concitat undas."

Which invention is by some ascribed to Ctesibius, an ingenious artist of Alexandria; by others to Archimedes of Syracuse, as Tertullian writes, of which he speaks thus, *Specta potentissimam Archimedis,*" &c.

As to the *hydraulic-organs* of modern Italy, of which Grassineau† says there were several in the grottos of vineyards, particularly one belonging to the family d'Este, near the Tiber, described by Baptista Porta, they were very different, and no way resembled the ancient *hydraulia.* These, perhaps, as Sir J. Hawkins remarks‡, will be found to be nothing more than the common organ played on by the barrel, which by a very easy contrivance is set in motion by a small stream of water.

3. *The Pneumatic-Organ.*

The various contrivances to introduce the wind into the pipes by means of water were not found to be successful, in spite of their seeming superiorities. A return was therefore made to the ancient bellows filled by manual labour. The Emperor Julian, called the Apostate (who died A. D. 363), is the reputed author of the following Greek enigmatical epigram, the solution of which is evidently the *pneumatic-organ.*

> Ἀλλοίην ὁρόω δονάκων φύσιν· ἦπου ἀπ' ἄλλης
> Χαλκείης τάχα μᾶλλον ἀνεβλάστησαν ἀρούρης,
> Ἄγριοι, οὐδ' ἀνέμοισιν ὑφ' ἡμετέροις δονέονται,
> Ἀλλ' ὑπο ταυρείης προθορὼν σπήλυγγος ἀήτης,

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* *Humane Industry*, p. 38.
† *Musical Dictionary*, 1743, p. 171.
‡ *Hist. of Mus.* bk. ii, chap. 14.

Νέρθεν ἐϋτρήτων καλάμων ὑπὸ ῥίζαν ὀδεύει.
Καί τις ἀνὴρ ἀγέρωχος ἔχων θοὰ δάκτυλα χειρὸς,
Ἵσταται ἀμφαφόων κανόνας συμφράδμονας αὐλῶν·
Οἱ δ' ἁπαλὸν σκιρτῶντες, ἀποθλίβουσιν ἀοιδήν.*

Thus *literally* translated:—

"I see a species of reeds: surely from another and a brazen soil have they quickly sprung—rude. Nor are they agitated by our winds, but a blast rushing forth from a cavern of bull's hide makes its way from below the root of reeds with many openings; and a highly-gifted man with nimble fingers handles the yielding rods of the pipes, while they, softly bounding, press out a sound."

This passage is highly interesting, as showing the state of the instrument at this early period. From it we learn that the organ was still unprovided with a *clavier*, or key-board, and that the bellows were made of a bull's hide. These facts have escaped the researches of former writers who have alluded to the enigma, from their *mistranslation* of the original Greek†.

We have here a curious representation of an organ of this period, which shows a singular mode of giving weight to the bellows. It is copied from the

* *Anthologia Græca*, Edit. Lips. 1794, tom. iii, p. 111; also Du Cange, *Glossarium et infimæ latinitatis*, v. organum.

† Burney translates the passage thus: "I see reeds of a new species, the growth of another and a brazen soil, such as are not agitated by our winds, but by a blast that rushes from a leathern cavern beneath their roots; while a robust mortal, running with swift fingers over the concordant *keys*, makes them, as they smoothly dance, emit melodious sounds."—*Hist. of Mus.* ii, 65. Busby gives a metrical translation:

"Reeds I behold, of earth the rigid spoil,
Reeds of a novel growth, and brazen soil:
That not heav'n's wind, but blasts mechanic breathe,
From lungs that labour at their roots beneath;
While a skill'd artist's nimble finger bounds
O'er dancing *keys*, and wakes celestial sounds."

—*Hist. of Mus.* i, 263. Both these learned writers use the word *keys*, which cannot, by any forced application, be found in the original. The word κανόνας (*canonas*) means

sculptures on the obelisk at Constantinople, erected by Theodosius, who died A. D. 395*.

Another curious description of the pneumatic organ is given by Cassiodorus, who flourished under King Vitigas, the Goth, A. D. 514, in his Commentary on the 150th Psalm†. "The organ," says he, "is an instrument composed of divers pipes, formed into a kind of tower, which, by means of bellows, is made to produce a loud sound; and, in order to express agreeable melodies, there are, in the inside, movements made of wood, that are pressed down by the fingers of the player, which produce the most pleasing and brilliant tones‡."

At the latter end of the seventh and beginning of the eighth century, the organs of the Anglo-Saxons appear to have resembled, even in their external decorations, those now in use. The following passage from Aldhelm§, who died A.D. 709, will show that our ancestors at that time were accustomed to gild the external pipes:

> "Maxima millenis auscultans organa flabrio,
> Mulceat auditum ventosis follibus iste,
> Quamlibet auratis fulgescant cætera capsis."

4. *Its Introduction into the Church.*

The *organ* was early used in the public service of the church. Platina tells us‖ that it was first employed for religious worship by Pope Vitalian I, A.D. 666; but, according to Julianus (a Spanish bishop, who flourished A. D. 450), it was in common use in the churches of Spain at least 200 years before Vitalian's time¶. The use of instruments in churches was much earlier; for

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"any straight rod or pole, especially to keep a thing upright or straight—to regulate and order it."—See Liddell and Scott's *Greek and English Lexicon.* Burney translates ἀγέρωχος, "a tall, sturdy fellow;" and then adds, "alluding to the force necessary to beat that kind of clumsy *carillon* keys of this rude instrument of new invention." This Greek enigma on the organ is given by Mr. Wackerbarth, in his *Music and the Anglo-Saxons*, p. 9, who adds—"It is obvious, from the sixth line, that it was played with finger-keys, and not by large carillon-keys." He then blames Dr. Burney for missing "the sense of the passage," but does not attempt a new translation. It is necessary to add that Mr. Wackerbath's copy of the eight Greek lines contains no fewer than twenty errors.

* Didron's *Annales Archéologiques*, Paris, 1845, contains an article on Organs by M. Coussemaker. Our engraving is derived from this valuable work.

† The passage is also quoted by Bede, tom. viii, 899, 900.

‡ Organum itaque est quasi turris quædam diversis fistulis fabricata, quibus flatu follium vox copiosissima destinatur; et ut eam modulatio decora componat, linguis quibusdam ligneis ab interiori parte construitur, quas disciplinabiliter magistrorum digiti reprimentis, grandisonam efficiunt et suavissimam cantilenam. In Psalm cl.

§ *De laude Virginum. Bibliotheca Maxima Patrum*, tom. xiii, p. 3. This passage was first pointed out by Mr. Sharon Turner, *Anglo-Saxons*, iv, 447.

‖ *Lives of the Popes;* Rycaud's translation, p. 114.

¶ See *Lorinus*, Psal. 33.

we are told that St. Ambrose joined instruments of music with the public service in the cathedral church of Milan; which example of his was so well approved of, that, by degrees, it became the general practice of other churches. Nay, the antiquity of instrumental church-music is still higher, if we may credit the testimony of Justin Martyr and Eusebius, the latter of whom lived fifty, and the former two hundred, years before the time of St. Ambrose*.

We have seen, from the Epigram of the Emperor Julian, before quoted, that an organ capable of being used in religious ceremonies existed long before the erection of Christian churches; we cannot then refuse to credit the testimony of Julianus, as to its admission into the service of public worship at an earlier period than that commonly assigned†.

It was some time before organs became common in the churches of Europe. Pepin (the father of Charlemagne), king of the Franks, an ardent worshipper of God, first introduced singing and the ceremonies of the Romish church into France. He soon perceived the urgent need of an organ, both as an aid to devotion, and as a proper accompaniment and support to the choir. Accordingly (as the instrument was unknown at that time both in France and Germany), this pious king applied to the Byzantine Emperor Constantine, surnamed Copronymus, soliciting him to forward one to France. The emperor complied with the request, and in the year 757, or thereabouts‡, sent him as a present, in charge of a special embassy§, a great organ with leaden pipes‖, which was placed in the church of St. Corneille, at Compiegne. It also appears that an organ, constructed by an Arabian named Giafar, was sent to Charlemagne by the renowned "Commander of the Faithful," the caliph Haroun Alraschid — an incident introduced with considerable effect by Madame de Genlis, in her romance, *Les Chevaliers du Cygne*. This was the instrument, in all probability, which Walafrid Strabo described as existing in the ninth century in a church at Aix-la-Chapelle. Its softness (query?) of tone, he adds, caused the death of a female¶. The French artists were eager

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* Hawkins, bk. iv, chap 32.

† Bingham (Christian Antiq. bk. viii, c. 7—16), and his followers, assert that the organ was first introduced into churches by Marinus Sanutas, in 1290! The authorities cited in the course of the present section completely refute this notion. Cardinal Bona supposes organs to have been used in churches in the fourth century.—*De Divin Psal.* 1653.

‡ Siegebert says 766: but Walter Odington, of Evesham (who wrote in the 13th century), is a preferable authority. His words are, "*Anno Domini* 757, venit Organum primo in Francium missum a potissima Rege Grecorum Pipino imperatori."—*De speculatione Musicæ.*

§ The deputation to King Pepin was headed by Stephanus, a Roman Bishop.—Aventini, *Annales Bavariæ.*

‖ Alax. Sardus, *De rerum Inventoribus*, lib. i.

¶ Eginhard, in his *Annals of Louis le Debonnaire*, and Nigellus, in his poem on the life and actions of Louis the Pious, printed in the *Scriptores Italici de Muratori*, both

to equal these specimens of foreign ingenuity; and so successful were their efforts, that, in the ninth century, it is said, the best organs were made in France and Germany. Their superiority was acknowledged by John VIII, in a letter to Anno, Bishop of Friesingen, from whom he requested an organ, and a master for the instruction of the Roman artists. The passage runs thus: "Precamur ut optimum organum cum artifice, qui hoc moderari, et facere ad omnem modulationis efficaciam possit, ad instructionem musicæ disciplinæ nobis aut deferas, aut mittas*."

Soon afterwards, we find them in common use in England, constructed by English artists, with pipes of copper fixed in gilt frames†. St. Dunstan, in the reign of Edgar, erected or fabricated an organ, the pipes of which were made of brass‡. The following notice of this instrument is preserved by William of Malmesbury:—"Ideo in multis locis munificus, quæ tunc in Anglia magni miraculi essent, decusque et ingenium conferentis ostenderent offerre credo. Itaque signa sono et mole præstantia, et organo ubi per æreas fistulas musicis mensuris elaboratas, 'dudum conceptas follis vomit anxius auras.' Ibi hoc distichon laminis æreis impressit—

> Organo de Sancto Præsul Dunstanus Aldhelmo;
> Perdat hic æternum qui vult hinc tollere regnum§."

This worthy prelate also caused an organ to be erected in the Abbey-church of Glastonbury.

In the same century, Count Elwin presented an organ to the Convent of Ramsey, on which it is said, "The earl devoted thirty pounds to make copper pipes of organs, which resting with their openings in thick order on the spiral winding in the inside, and being struck on feast days with a strong blast of bellows, emit a sweet melody, and a far resounding peal‖."

In the old church of Winchester was a monster organ, according to its

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speak of the organ at Aix-la-Chapelle; but they allude to the *hydraulicon*, not tothe *pneumatic-organ*. The former was in the palace of the King, the latter in the church. Historians have strangely confounded the two.

* Sandini, in *Vit. Pont.* i, p, 294. See also Dr. Lingard's *Antiquities of the Anglo-Saxon Church*, ii, p. 376.

† *Aldhelm* in *Gale*, pp. 266, 420, cited by Lingard, *Anglo-Saxon Church*, ii, p. 376. See also the curious passage from Aldhelm quoted in a previous section, *ante*, p. 13.

‡ St. Dunstan died A. D. 988.

§ Gale, tom. iii, p. 366; Wackerbarth's *Music and the Anglo-Saxons*, p. 19.

‖ The original Latin of this passage is thus given in the *Acta Sanctorum*:—"Triginta præterea libras ad fabricandum cupreos organorum calamos erogavit, qui in alveo suo, super unam cochlearum denso ordine foraminibus insidentes, et diebus festis follium spiramento fortiore pulsati, prædulcem melodiam et clangorem longius resonantem ediderunt.

De Ædnotho juniore, qui, senescente altero Ædnotho, curæ exterioris pro eo occepit administrationem.—*Acta S. S. Ord. Benedict Sæculo* v, p. 756. See also *Gale*, tom. iii, p. 420.

description by the monk Wulston*, whose fidelity, as Lingard remarks, cannot be questioned, since he dedicated his poem to Bishop Elphege†, by whose order the organ was built about the close of the tenth century. The portion of Wulston's poem relating to the organ is as follows :—

"Talia et auxistis hic organa qualia nunquam
Cernuntur, gemino constabilita solo.
Bisseni supra sociantur ordine folles,
Inferiusque jacent quatuor atque decem,
Flatibus alternis spiracula maxima reddunt
Quos agitant validi septuaginta viri;
Brachia versantes, multo et sudore madentes,
Certatimque suos quisque movet socios,
Viribus ut totis impellant flamina sursum
Rugiat et pleno capsa referta sinu
Sola quadringentas quæ sustinet ordine musas
Quas manus organici temperat ingenii.
Has aperit clausas, iterumque has claudit apertas
Exigit ut varii certa camæna soni.
Considuntque duo concordi pectore fratres,
Et regit alphabetum rector uterque suum.
Suntque quaterdenis occulta foramina linguis,
Inque suo retinet ordine quæque decem:
Huc aliæ currunt, illuc aliæque recurrunt
Servantes modulis singula puncta suis;
Et feriunt jubilum septem discrimina vocum
Permixto lyrici carmine semitoni:
Inque modum tonitrus vox ferrea verberat aures,
Præter ut hunc solum nil capiat sonitum.
Concrepat in tantum sonus hinc illincque resultans,
Quisque manu patulas claudat ut auriculas,
Haudquaquam suffere valens propiando rugitum,
Quem reddunt varii concrepitando soni:
Musarumque melos auditur ubique per urbem,
Et peragrat totam fama volans patriam.
Hoc decus Ecclesiæ vovit tua cura Tonanti,
Clavigeri inque sacri struxit honore Petri‡."

Thus translated by Mr. Wackerbarth§ :—

"Such organs as you have built are seen nowhere, fabricated on a double ground. Twice six bellows above are ranged in a row, and fourteen lie below. These, by alternate blasts, supply an immense quantity of wind, and are worked by seventy strong men, labouring with their arms, covered with perspiration, each inciting his companions to drive the wind up with all his

* Called Wulston or *Wolston* the Deacon. He died A. D. 963.

† Elphegus Calvus received the Bishopric of Winchester in A. D. 935, and held it till 951.

‡ *Acta Sanctorum Ordinis Benedict Sæc.* v, p. 631—2.

§ *Music and the Anglo-Saxons*, p. 12—15.

strength, that the full-bosomed box may speak with its four hundred pipes which the hand of the organist governs. Some when closed he opens, others when open he closes, as the individual nature of the varied sound requires. Two brethren (religious) of concordant spirit sit at the instrument, and each manages his own alphabet. There are, moreover, hidden holes in the forty tongues, and each has ten (pipes) in their due order. Some are conducted hither, others thither, each preserving the proper point (or situation) for its own note. They strike the seven differences of joyous sounds, adding the music of the lyric semitone. Like thunder the iron tones batter the ear, so that it may receive no sound but that alone. To such an amount does it reverberate, echoing in every direction, that every one stops with his hand his gaping ears, being in no wise able to draw near and bear the sound, which so many combinations produce. The music is heard throughout the town, and the flying fame thereof is gone out over the whole country. This honorable church has your care dedicated to the Ruler of the thunder, and built up in honour of the key-bearing St. Peter*."

Although this curious description gives the idea of an instrument of large size and complicated mechanism, its construction must have been of a very primitive kind. Mr. Wackerbarth imagines that it possessed registers or stops; a key-board furnished with semitones; and a compass of three and a half octaves. Of the first position, we have no proof whatever in the poem itself. Of the second, all the writer says is that it was provided with the seven sounds and the "lyric semitone," which latter clearly means the B flat. The alphabet alluded to was the handles of the rods or levers by which the instrument was played; the key-board was not yet invented. Of the third position, it is clear that the compass did not exceed ten notes, "and for each note forty pipes," which makes up the number of *four hundred*. The *seventy* stout bellows-blowers must still remain a perplexing question. The brethren of Winchester were a rich and a large body, and the writer probably meant that it was the office of seventy inferior monks, at different periods, to succeed

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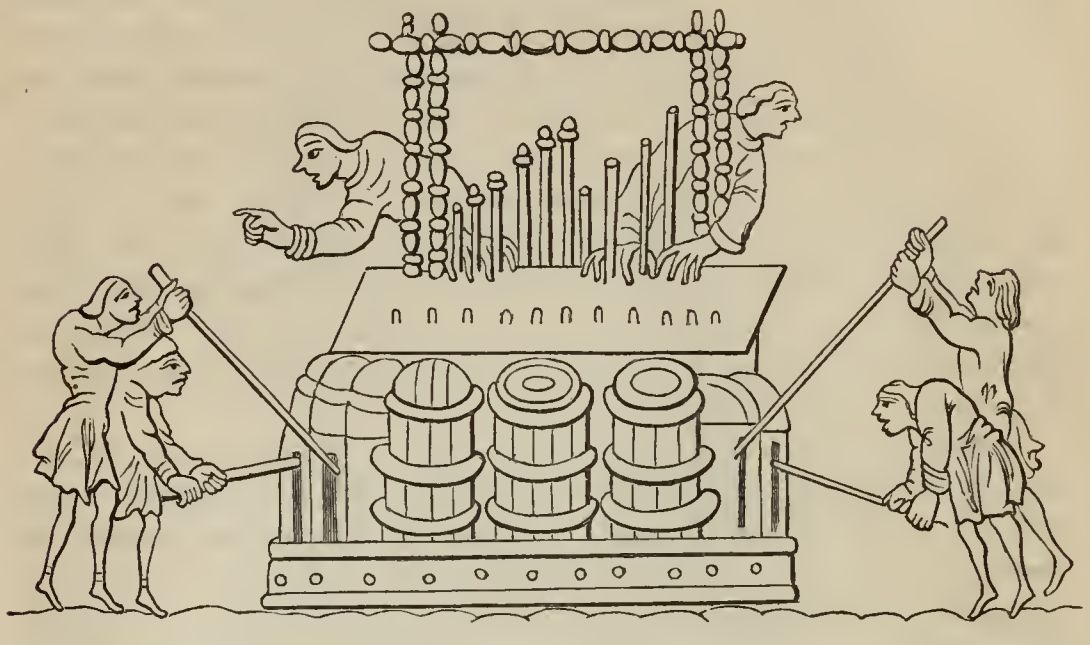
* Mason (*Essays on English Church Music*, p. 37) gives the following metrical translation of eight lines of Wulstan's poem. He was not aware of the original, but quoted from Dom Bedos, who in his turn took the passage from Du Cange's *Glossary:*

"Twelve pair of bellows, rang'd in stated row,
Are join'd above, and fourteen more below:
These the full force of seventy men require,
Who ceaseless toil, and plenteously perspire;
Each aiding each, till all the wind be prest
In the close confines of th' incumbent chest,
On which four hundred pipes in order rise
To bellow forth the blast, that chest supplies."

Bedos, and after him Mason, erroneously say that this organ was erected at Westminster.

each other in this labour. Or probably *seventy* may be a corruption of the text for seven.

An interesting representatiou of the pneumatic organ of about this period is preserved in a MS. Psalter of Eadwine, in the library of Trinity College, Cambridge*. It is here copied:



At the close of the tenth century many organs existed in the churches of Germany. Michael Prætorius, in his *Syntagma Musica*, mentions (under the date 944) those in the Paulina Church at Erfurt, in St. James's Church at Magdeburg, and in the Cathedral at Halberstadt. Notwithstanding the imperfection of these instruments, they everywhere produced the greatest astonishment, and the churches were desirous of possessing so efficacious a means of attracting a congregation. We therefore find, in this century, that organs multiplied not only in the cathedral churches of the episcopal seats, but also in many churches and monastic establishments.

5. *Organ-Building in the Eleventh Century.*

The following very curious treatise upon the *Construction of Organs* is part of a larger work upon *Divers Arts*, by a monk named Theophilus.

There is a considerable diversity of opinion as to the exact period at which the writer flourished. Lessing, Leist, Raspe, and Emeric David, have placed him in the *tenth* century, a period too early. Guichard, Didron, and Texiér consider that he belongs to the *twelfth* or *thirteenth* century. Mr. Hendrie,

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* Under the press mark Insig. R, 17, 1. It is engraved in Strutt's *Horda*, i, pl. 33.

in his learned preface to the English translation of Theophilus*, shows, pretty clearly, that the work in question may be assigned to the early half of the *eleventh* century.

The most ancient manuscripts that have descended to us, are of the latter part of the twelfth, or the early part of the following century. One is preserved at Wolfenbüttel; another in the Imperial Library, Vienna; a third is in the University Library, Cambridge; and a fourth among the Harleian MSS. in the British Museum. The three first-named manuscripts end abruptly, closing with the first chapter on the Construction of the Organ. The Harleian MS. enriches the musical enquirer with *three* new chapters upon the mode of building the "King of Instruments" in the eleventh century†.

Theophilus's treatise has escaped the notice of all writers, both foreign and English, who have devoted their time and talents to the consideration of musical antiquities. Such being the case, the author has considerable pleasure in being the first to introduce it into that department of musical history to which it particularly belongs.

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* Theophili, qui et Rugerus, Presbyteri et Monachi Libri III, de Diversis Artibus. Opera et Studio Roberti Hendrie. Londini, Johannes Murray, MDCCCXLVII. 8vo. The author owes his knowledge of this curious treatise on the organ entirely to Mr. Hendrie's valuable book. The following translation is taken (with permission) from that gentleman's publication.

† This manuscript is upon vellum, in octavo, and is written in a clear German character of the very commencement of the thirteenth century. Sir F. Madden, the keeper of the manuscripts at the British Museum, and whose authority is conclusive, states that it is of that period, and that it was certainly written in Germany. It contains 115 folios of the books of Theophilus, and five folios of recipes relating to the arts, written by another hand of the period. A treatise, "De Unguentis," follows; it is a collection of medical recipes. The title and preface to the first book are unfortunately wanting; in so voluminous and superior a copy something might have been otherwise adduced from these which would have unravelled the mystery which shrouds the age and country of our author. The credit of discovering this important manuscript is entirely due to Mr. Hendrie. See his preface to *Theophilus*, p. xxvi.

Theophili Libri Tertii de Diversis Artibus*.

(ORIGINAL.)

CAPUT LXXXI.

DE ORGANIS.

Facturus organa primum habeat lectionem mensuræ, qualiter metiri debeant fistulæ graves et acutæ et superacutæ; deinde faciat sibi ferrum longum et grossum ad mensuram, quam vult habere fistulas, quod sit in circuitu, rotundum summâ diligentiâ limatum et politum, in unâ summitate grossius et modicè attenuatum, ita ut possit imponi in alterum ferrum curvum per quod circumdatur, juxta modum ligni in quo volvitur runcina, et in alterâ summitate gracile, secundum mensuram inferioris capitis fistulæ, quæ conflatorio debet imponi. Deinde attenueter cuprum purum et sanissimum, ita ut unguis impressus alterâ parte appareat. Quod cum fuerit secundum mensuram ferri lineatum et incisum ad longiores fistulas, quæ dicuntur graves, fiat secundum præceptum lectionis foramen, in quo plectrum imponi debet, et circumradatur modicè ad mensuram festucæ (fistulæ), ac superliniatur stagnum ferro solidatorio, radaturque in orâ longitudinis interiùs, in alterâ orâ exteriùs câdem mensurâ, et superstagnetur tenuè. Quæ stagnatura, priusquam rasi tractus noviter facti, modicè calefacto cupro liniantur cum resina abietis, ut stagnum facilius adhæreat. Quo facto, complicetur ipsum cuprum circa ferrum et circumligetur filo ferreo mediocriter grosso fortiter, ita ut stagnati tractus conveniant sibi. Quod filum primo induci debet parvulo foramini, quod est in gracili summitate ferri, et in eo bis contorqueri, sicque deduci in volvendo usque ad alteram summitatem, ibique similiter obfirmari. Deinde juncturis sibi convenientibus et diligenter conjunctis, ponatur ipsâ ligaturâ pariter cum ferro ante fornacem super prunas ardentes, et sedente puero et mediocriter flante, teneatur dexterâ manu lignum gracile, in cujus summitate fissâ, adhæreat panniculus cum resina, et sinistrâ tenetur stagnum longum gracile percussum, ut mox cum fistula incalescrit, liniat juncturam cum panniculo resina infecto, appositumque stagnum liquefiat, ipsamque juncturam (addidimus) diligenter consolidet. Quo facto, refrigeratâ fistulâ, ponatur ferrum in instrumento tornatoris more parato, impositoque curvo ferro et filo soluto circumvolvat unus ferrum curvum, alter vero, utrisque manibus chirothecis indutis, fistulam fortiter tenet, ita ut ferrum circumducatur et fistula quieta maneat, donec omnino oculis gratiosa sit, quasi tornata sit. Deinde educto ferro percutiatur ipsa fistula cum malleo mediocriter juxta foramen

* A few corrections have been made in the text, such as the grammatical construction obviously suggested.

Theophilus's Treatise on Organ-Building.

(TRANSLATION.)

CHAP. I.

OF ORGANS.

The manufacturer of organs should first possess the knowledge of the measure, how the grave and sharp and treble pipes should be meted out; he may then make for himself a long and thick iron to the size which he wishes the pipes to possess; this must be round, filed and polished with great care, thicker at one extremity and slightly diminished, so that it can be placed in another curved iron, by which it is encompassed, after the fashion of the wood in which the auger is revolved, and at the other extremity let it be slender, according to the size of the lower end of the pipe which should be placed on the bellows. Then pure and very sound copper is thinned, so that the impression of the nail may appear on the other side. When this has been marked out and cut according to the size of the iron for the longer pipes, which are called grave, an opening is made according to the precept of the lesson, into which the valve should be placed, and it is rasped round a little to the size of the rod*, and tin is anointed over it with the soldering iron, and it is rasped upon one edge of the length inside, and outside, upon the other edge, and it is tinned over thinly. Which tinnings, before the newly made lines are scraped, are slightly anointed, the copper being warmed with resin of the fir, that the tin may the more easily adhere. Which being done, this copper is folded around the iron and is strongly bound round with an iron wire moderately thick, so that the tinned lines may agree with each other. This wire should be first carried through a very small hole which is at the thin extremity of the iron, and be twisted twice round in it, and so be carried down revolving to the other extremity, and be there similarly fastened. Then with its joinings agreeing together and carefully fastened, it is placed with its ligature, as with the iron, before the furnace upon the glowing embers, and the boy sitting and slightly blowing, in the left hand is held a thin wood, at the split top of which a small cloth with resin is fixed, and in the right can be held a long piece of tin beaten thin, so that directly the pipe has become hot he can anoint the join with the rag filled with resin, and the tin applied may liquefy, and he must carefully solder the join together. Which being done, the pipe cold, the iron is placed in the instrument prepared like that of a turner, and the curved iron being placed on, and wire loosened, one

* "Pipe," in the Wolfenbüttel MS.

inferius et superius, ita ut pene usque ad medium descendat ipsa rotunditas spatio duorum digitorum; fiatque plectrum ex cupro aliquantulum spissiori, quasi dimidia rotula, et superstagnetur circa rotunditatem sicut fistula superius, sicque ponatur in inferiori parte foraminis, ut sub ipsius ora æqualiter stet, nec procedat inferius aut superius. Habeat quoque ferrum solidatorium ejusdem latitudinis et rotunditatis, quâ plectrum est. Quo calefacto ponat modicas particulas stagni super plectrum, parumque resinæ, et diligenter circumducat calidum ferrum ne plectrum moveatur, sed liquefacto stagno sic adhæreat ut in circuitu ejus nichil spiraminis exeat, nisi tantum in superiori foramine. Quo facto apponat ori et sufflet primum modice, deinde amplius, sicque fortiter, et secundum quod auditu discernit, disponat vocem, ut si eam vult esse grossam, foramen fiat latius; si vero graciliorem, fiat strictius. Hoc ordine omnes fistulæ fiant; mensuram vero singularum, a plectro superius, secundum magisterium lectionis faciat, a plectro autem inferius, omnes unius mensuræ et ejusdem grossitudinis erunt.

CAPUT LXXXII.

DE DOMO ORGANARIA.

Domum vero facturus super quam statuendæ sint fistulæ, vide utrum volueris eam ligneam habere aut cupream. Si ligneam, acquire tibi duo ligna de platano, valde sicca, longitudine duorum pedum et dimidii, et latitudine modicè amplius, quam unius, unum quatuor, alterum duobus digitis spissum, quæ non sint nodosa sed pura. Quibus diligentissimè sibi conjunctis, in inferiori parte spissioris ligni fiat in medio foramen quadrangulum, amplitudine quatuor digitorum et circa quod relinquatur de eodem ligno limbus, unius digiti latitudinis et altitudinis, in quo conflatorium inponatur. In superiori parte verò lateris fiant cavaturæ, per quas flatus ad fistulas possit pervenire. Altera vero pars ligni, quæ et superior esse debet, metiatur interius æqualiter, ubi disponantur septem vel octo cavaturæ, in quibus diligenter jungantur linguæ, ita ut habeant facilem cursum educendi et reducendi, sic tamen ut nichil spiraminis inter juncturas exeat.

In superiori autem parte tonde cavaturas, contra inferiores, quæ sint aliquantulum latiores, in quibus jungantur totidem ligna, ita ut inter hæc et majus, ligni cavatura remaneat vacua, per quam ventus ascendat ad fistulas, nam in eisdem lignis foramina fieri debent, in qvibus fistulæ stabiliendæ sunt. Ca-

(hand) can revolve the curved iron, the other, both hands being provided with gloves, can hold the pipe firmly, so that the iron may be carried round and the pipe remain still, until it appear elegant to the eyes, as if turned. The iron being then taken out, the pipe is struck slightly with the hammer near the opening, above and below, so that this round shape may depress almost to the centre for a space of two fingers; the valve may be made from copper somewhat thicker, like a half wheel, and be soldered over about the round part, as the pipe above, and be so placed in the lower part of the opening that its edge may stand equally under it, nor protrude below or above. He can have also a soldering iron of the same breadth and roundness as is the valve. With this, heated, he can place small particles of tin upon the valve, and a little resin, and can carefully pass over the hot iron that he may not move the valve, but that the tin being melted it may so adhere that no wind can come out in its circumference, unless only into the upper opening. Which being done he can bring it to his mouth and blow at first slightly, then more, and then strongly; and according to what he discerns by hearing, he can arrange the sound, so that if he wish it strong, the opening is made wider; if slighter, however, it is made narrower. In this order all the pipes are made; he can make the measure of each, from the valve upwards, according to the rule inculcated, but from the valve below, all will be of one measure and of the same thickness.

CHAP. II.

OF THE ORGAN ERECTION.

In the manufacture of the construction, upon which the pipes are to stand, see whether you intend to have it of wood or copper. If of wood, procure for yourself two pieces of wood of the plane tree, very dry, two feet and a half in length, and in breadth rather more than one; one four, the other two fingers thick, which must not be knotty, but without blemish. Which being carefully joined together, in the lower part of the thicker wood a square hole must be made in the centre, four fingers in breadth, and about which, borders must be left of the same wood of one finger in breadth and height, in which the bellows can be placed. In the upper part of the side, however, small hollows are made, through which the wind can arrive at the pipes. But the other part of the wood, which should also be uppermost, is measured out inside equally, where seven or eight small openings are disposed, in which the stops are carefully joined, so that they may have an easy means of being drawn out or restored, so, however, that no air can come out between the joins.

In the upper part, however, cut small openings opposite the lower ones, which may be rather wider, in which may be joined so many pieces of wood,

vaturæ in quibus linguæ junctæ sunt in anteriori parte, procedere debent quasi obliquæ fenestræ, per quas ipsæ linguæ introducantur et extrahantur.

In posteriori vero parte, sub fine ipsarum linguarum, fiant foramina æqualiter lata et longa, mensura duorum digitorum, per quas ventus possit ascendere ab inferioribus ad superiora, ita ut cum linguæ impinguntur, illa foramina ab eis obstinantur, cum vero retrahuntur denuò pateant. In his vero lignis quæ super linguas junguntur fiant foramina diligenter et ordinatè, secundum numerum fistularum, uniuscujusque toni, in quibus ipsæ fistulæ imponantur, ita ut firmiter stent, et ab inferioribus ventum suscipiant. In caudis autem linguarum scribantur litteræ secundum ascensum et descensum cantus, quibus possit cognosci quis ille, vel ille tonus sit. In singulis autem linguis fiant foramina singula gracilia, longitudine dimidii digiti minoris, in anteriore parte, juxta caudas in longitudine, in quibus ponantur singuli clavi cuprei capitati, qui pertranseant in medio fenestellas, quibus inducuntur ipsæ linguæ a superiori latere domus usque ad inferius, et appareant clavorum capita superius ita, ut cum linguæ cantantibus organis educuntur, non penitus extrahuntur. His ita dispositis conglutinentur hæc duo ligna, quæ domum organorum conficiunt glutine casei; deinde partes illæ quæ super linguas sunt junctæ, in quibus foramina stant, sicque circumcidantur diligentèr et radantur.

CAPUT LXXXIII.

DE CONFLATORIO.

Conflatorium facturus, conjunge tibi duo ligna de platano modo quo supra, longitudine pedis unius, quorum sit unum palma spissum, alterum tribus digitis, sintque in unâ fronte rotunda in modum scuti, et ibi pede et dimidio lata; in alterâ fronte obtusa, latitudine unius palmi. Quæ cum diligenter conjuncta fuerint incide in spissiori ligno in rotunda fronte foramina quod volueris, secundum numerum follium, et in obtusa fronte unum, quod sit majus. Deinde incide ab unoquoque foramine fossam unam deductam usque ad majus, per quas viam possit habere ventus flantibus follibus. Sicque conglutinabis ipsa ligna glutine casei, et circumdabis panno lineo novo et forti, quem linies eodem glutine ut adhæreat, facies quoque ligaturas ferreas fortes, interius et exterius circumstagnatas, ne possint ex tigneâ (tignariâ?) dissolvi, quas configes clavis longis capitatis atque stagnatis, ita ut inter duo foramina

so that between these and the larger, the openings of the wood may remain empty through which the wind can mount to the pipes; for in these same pieces of wood openings should be made in which the pipes are to be made fast. The openings in which the stops are fitted in the front part should increase, like slanting windows, through which these stops are introduced and removed.

In the hinder part, under the end of these stops, holes are made equally wide and long of the size of two fingers, through which the wind can ascend from the lower to the upper parts, so that when the stops are pressed upon them these holes may be stopped by them; when, however, they are withdrawn, they may again lie open. In those pieces of wood which are joined upon the stops openings are made, carefully and in order, according to the number of the pipes of every tone, in which these pipes are placed, so that they may stand firmly and receive the wind from the lower parts. But in the handles of the stops letters are marked, according to the rise and fall of the sound, by which it can be known which tone it may be. In each one of these stops single slender holes are made, half of the little finger in length, in the front part, near the handles, lengthwise, in which single copper-headed nails may be placed, which may pass through the small windows in the middle, by means of which these stops are drawn from the upper side of the construction down to the lower, and the heads of the nails appear above, so that when the stops are withdrawn from the sounding instruments, they cannot be quite extracted. These things being thus arranged, these two pieces of wood, which perfect the organ-house, are joined together with cheese-glue; then those parts which are joined over the stops, in which the holes exist, are also pared round carefully, and scraped.

CHAP. III.

OF THE BELLOWS.

In making the wind-chamber, join together two pieces of wood of the plane tree, in the above mode, of one foot in length, one of which may be a palm thick, the other three fingers, and let them be round at one end, like a shield, and there a foot and a half wide, at the other end blunt, a palm in breadth. When these have been carefully fitted together, cut, in the round front in the thicker wood, the openings which you wish, according to the number of the bellows, and in the blunt end one, which must be larger. Then cut, from each opening, a hollow leading to the larger opening, through which the wind may have way to the working bellows; and you will thus glue these woods together with the cheese-glue, and you will bind them round with a linen cloth, new and strong, which you anoint with the same casein glue that it may adhere: you also make strong iron bindings tinned over

ligatura sit, quæ comprehendat utrumque lignum a superiore latere usque ad inferius. Deinde acquire tibi lignum curvum de quercu, sanum et forte, quod habeat in una fronte, a curvatura longitudinem pedis unius, in altera duorum, quod perforabis in utrâque fronte terebro magno, quo forantur modioli in rotis aratri. Sed quia foramina non possunt sibi obviare propter curvaturam, fac tibi ferrum quod habeat caput rotundum in modum ovi, et caudam longam gracilem, quæ imponatur manubrio, sitque juxta caput modicè curvum, cum quo calefacto, combures foramina interius in curvaturâ, donec sibi æqualiter conveniant. Quo facto, incide ipsum lignum quadrico (quadratò?) statum, ita ut in unoquoque latere uno palmo latum sit, ad mensuram conflatorii in obtusâ parte. Post hæc conjunge ipsum lignum in longiori parte, ad inferius foramen domus organariæ, ita ut eidem ligno cauda incidatur, unius pollicis longa, quæ ipsi foramini imponatur, vel inferatur, et junctura tam subtilis sit, ut nichil flatus inter eam exire queat. Alteram vero frontem conjunges eodem modo ad conflatorium, et ipsum lignum glutine casci firmabis, atque circumvolves panno totum lignum cum juncturâ, cui etiam circumfiges cuprum latum quod utriusque ligni oram capiat. His ita completis, si volueris organa ultra maceriam muri stabilire, ita ut infra monasterium nichil appareat, nisi sola domus cum fistulis, et ex alterâ parte muri folles jaceant, ita oportebit te ipsam domum convertere ut linguæ versus folles extrahantur, et in ipso muro arcus fiat in quo cantor sedeat, cujus sedes ita aptetur, ut pedes supra conflatorium teneat. Est autem foramen quadrum in medio arcus trans maceriam, per quod domus cum fistulis exponitur; et super collum conflatorii, quod in muro infra foramen lapidibus obfirmatum est, in suâ juncturâ sistitur, atque super duos clavos ferreos æqualiter in muro confixos nititur, cui foramini fenestra lignea appendet, quæ dum clausa, serâ et clave munitur, nemo ignotus supervenicns cognoscere valet quid in eâ contineatur. Exterius quoque, super organa, pannus spissus lignis interius extensus, in modum domunculæ, a laquearı in funiculo ad arcendum pulverem dependeat, qui funiculus super ipsum laquear circa rotulam arte compositus, dum cantandum est organis trahitur, et domunculam elevat, finitoque cantu, denuò super organa deponitur. Habet quoque ipsa domuncula pinnam ex eodem panno, lignis quatuor in speciem trianguli extensam, in cujus summo sperula (sphærula?) lignea stet, cui funiculus inhæret. Folles et instrumentum super quod jaccant, secundum situm loci ad libitos tuos dispone.

within and without, that they may not become disunited from the woodwork, these you will fix on with long nails, headed and tinned, so that between the two openings a binding may exist, which may include each wood from the upper to the lower side. Then procure for yourself a curved piece of oak wood, sound and strong, which must have at one end, from the curve, the length of one foot, in the other of two, which you will pierce in each end with a large auger, with which the middle portions are pierced in the wheels of ploughs. But because the openings cannot meet together, on account of the curve, make for yourself an iron which may have a round head, like an egg, and a long thin stem, which is fitted with a handle, and let it be slightly curved, near the head, with which, made hot, you burn the holes curved inside, until they meet together in an even manner. Which being done, cut this wood in a square manner, set so that it be one palm wide in each side, to the size of the wind-chamber in the blunt part. After these things join this wood on the longer part, to the lower opening of the organ construction, so that a projection may be cut to the same wood a thumb in length, which can be placed, or forced into this opening, and that the join be so subtle that no wind can escape from it. You join on in the same manner the other end to the bellows, and will fasten this wood with cheese-glue, and will wrap round the whole wood, with the join, with cloth, to which you also fix a wide piece of copper which may also compass the edge of each wood. These things being thus completed, should you wish to establish the organ beyond the masonry of the wall, so that nothing may appear beneath the cloister, unless the erection alone with the pipes, and that the bellows may extend from the other side, you must so turn the construction that the stops may be drawn out towards the bellows, and an arch may be made in the wall itself in which the chanter can sit, whose seat is so adapted that he can keep his feet above the bellows. There is also a square opening in the middle of the arch through the masonry, through which the construction with the pipes is laid out; and upon the neck of the bellows which is in the wall beneath, the opening is made firm with stones, it is supported at its junction, and is rested upon two long iron nails evenly fixed in the wall; to this opening a wooden window hangs, which, when shut, is defended by a lock and key, that no stranger coming unawares be able to learn what may be contained in it. Outside also, above the organ, a thick drapery, extended inside with wood like a dome, for warding off the dust, can hang by a rope from the ceiling, which rope, arranged with art around a wheel above the ceiling itself, is drawn whilst the organ is sounding, and thus raises the roof, and the chant being finished, it is lowered upon the organ. This dome also has a spire, made from the same cloth, extended by four pieces of wood in shape of a triangle, at the top of which a small wooden ball can stand, to which the rope cleaves. The bellows, and the instrument upon which they may lie, arrange at your pleasure according to the situation of the spot.

CAPUT LXXXIV.

DE DOMO CUPREA ET CONFLATORIO EJUS.

Secundum abundantiam fistularum dispone longitudinem et latitudinem domus, et fac formam in argillâ maceratâ, siceatamque diligenter ineide quâcunque mensurâ volueris, et cooperi cerâ, diligenter inter duas æqualiter spissas hastulas eum rotundo ligno attenuatâ. Deinde incide foramina linguarum in ipsâ cerâ, et foramen inferius, per quod ventus introeat; additis spiraculis, eum infusorio cooperi eâdem argillâ semel, et iterum ae tertio. Cumque siceata fuerit forma, eodem modo funde quo supra formam turibuli. Conflatorium quoque formabis in argillâ proeedentibus undique inferius venti aditibus, ad similitudinem radicis unius arboris, et in summo in unum foramen convenientibus. Quod cum mensurate dispositum cultello ineideris, cooperi cerâ, et fac sieut supra. Cumque domum fuderis conjunges interius altitudine unius digiti a fundo, tabulam cupream duetilem sub foraminibus linguarum æqualiter, ut supra eam ipsæ linguæ jaeeant, ita ut possint æqualiter produei et induei, illitisque ipsis linguis tenui argillâ, reliquum domûs perfundes liquefaeto plumbo, per omnia, super ipsas linguas usque ad summum. Quo facto, ejieies ipsum plumbum diligenter designabisque foramina fistularum in linguis; deinde in ipso plumbo et eum graeili ferro, vel terebro, perforabis diligentissime. Deinde sub linguis ventorum aditus faeies, induees ipsas linguas singulas in suis loeis, atque repones plumbum et cum malleo in percutiendo conjunges domui, ut niehil spiraminis exeat, nisi per foramina quibus fistulæ imponendæ sunt. Cum vero conflatorium fuerit fusum et limatum, atque uniuseujusque follis fistula suo induetorio coaptata, conjungi et firmiter consolidari debet ad domum organariam inferius, ita ut ventus suos aditus liberè inveniat, et per alias juneturas nullatenus exeat. Hoe quoque sollertius* proeurandum est, ut in eapite uniuseujusque follis, ante foramen fistulæ suæ, euprum tenue dependeat; quod spiraminis elaudat aditum, ita ut eum follis flando deponitur illud cuprum se elevet, et ventus pleniter exeat; eumque follis elevatur ut per ventilabrum suum flatum resumat, illud euprum os ejus penitus elaudat, et ventum quem emisit redire non permittat.

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* In MS. sollerterius.

CHAP. IV.

OF THE COPPER CONSTRUCTION AND ITS BELLOWS.

Dispose the length and width of the case according to the number of the pipes, and make a mould in beaten clay, and, being dry, cut it to whatever size you may wish, and cover it with wax carefully thinned, between two rods equally thick, with the round wood. Then cut the openings of the stops in this wax, and the hole below through which the wind can enter; the air-holes with the funnel being added, cover altogether with the same clay, and again, and a third time. And when the mould has become dry, cast in the same manner as the form of the censer above mentioned. You will also fashion the bellows in clay, the wind-issues proceeding everywhere below in the similitude of the roots of a tree, and meeting at the top in one opening. Which, when disposed in rule you have cut with a knife, cover with wax and act as above. And when you have cast the case, you join, inside, at the height of one finger from the bottom, a beaten copper plate, in an even manner under the openings of the stops, that these stops may rest upon it, so that they can be smoothly drawn forth and returned; and lining these stops with thin clay, you pour over the rest of the case some melted lead everywhere, over these stops up to the top. This being done, you cast out this lead and will carefully mark the openings of the pipes in the stops; then you will most carefully perforate in this lead with a thin iron or with a bore. Then you make the issues for the wind under the stops; you introduce these stops singly in their places, and you replace the lead and you fit them to the construction by beating with the hammer, so that no wind can issue, unless through the openings in which the pipes are placed. When the wind-case has been cast and filed, and the pipe of each air-issue fitted to its conductor, it should be joined together and firmly soldered below to the organ construction, so that the wind may find its access freely, and can in nowise issue through the other joints. This also is to be carefully provided, that a thin piece of copper may hang down before the opening of its pipe, which can close the access of the air-hole, so that when by the breathing of the bellows this copper is displaced, it may rise, and the wind may freely issue; and when the bellows is raised, so that it may recover air through its own ventilator, this copper can quite close its mouth and not permit the wind which it emitted to return.

Such is the highly interesting and valuable paper left us by this ancient monk—valuable in many points, but particularly so as clearing up the debated point of the invention of the clavier or key-board. THE ORGAN OF THEOPHILUS WAS UNPROVIDED WITH ONE.

In a Saxon MS. of the elcventh century, preserved in the British Museum (*Cott. Tiberius*, B. 6) is a drawing of the "Bumbulum cum fistula aereâ," with brass pipes. This *Bumbulum* appears to be an organ, played upon in the same manner as that described by the monk. But a better representation is preserved in Gori's *Thesaurus Diptychorum* (said to be from an ancient MS. of the time of Charlemagne), which is here copied:

King David is depicted sitting on a throne, striking a lyre with his left hand, and holding a sceptre in his right. His head is accompanied by two different kinds of ornaments. One is the glory, the emblem of sanctity and eternity, and the other a turreted crown, representing a city with a gate. This is, perhaps, the holy Jerusalem, or that happy Sion, "whose gates the Lord loveth," as David himself sings. He is probably engaged in singing psalms, assisted by four musical instruments; the *pneumatic* organ, a sort of violin, a trumpet, and a set of bells.

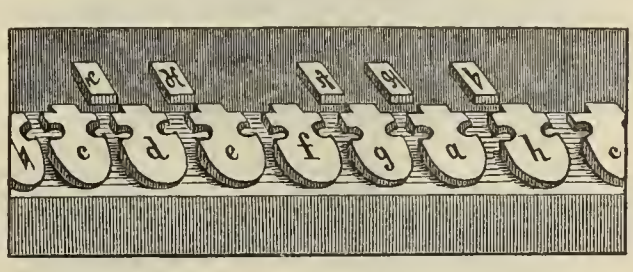
SECOND EPOCH.

THE MEDIÆVAL ORGAN, AFTER THE INVENTION OF THE KEY-BOARD.

6. *The First Key-board.*

THE close of the eleventh century forms an era in the history of organ-building, when an organ is said to have been erected in the Cathedral at Magdeburg, with a *key-board* consisting of *sixteen* keys. In the earlier organs, the number of notes was very limited. From nine to eleven was nearly their greatest extent, and the execution of the plain-chant did not require more. Harmony, it will be remembered, was still unknown.

The keys of the Magdeburg organ were an ell long and three inches broad. The following diagram, showing their form, is copied from Prætorius, *Theatrum Instrumentorum seu Sciagraphia.* 4to. Wolfenbüttel, 1620.



Dom Bedos speaks of some early organs whose keys were five inches and a half wide. The manner of performing upon these instruments was of course conformable to the size of the keys. They were struck down by the *fist* of the player, even to a considerable depth, whence, according to Seidel, arose the expression Organ-*beater*. This method resembles that of *Carillon*-playing*, still in use in some parts of France, Germany, and Holland.

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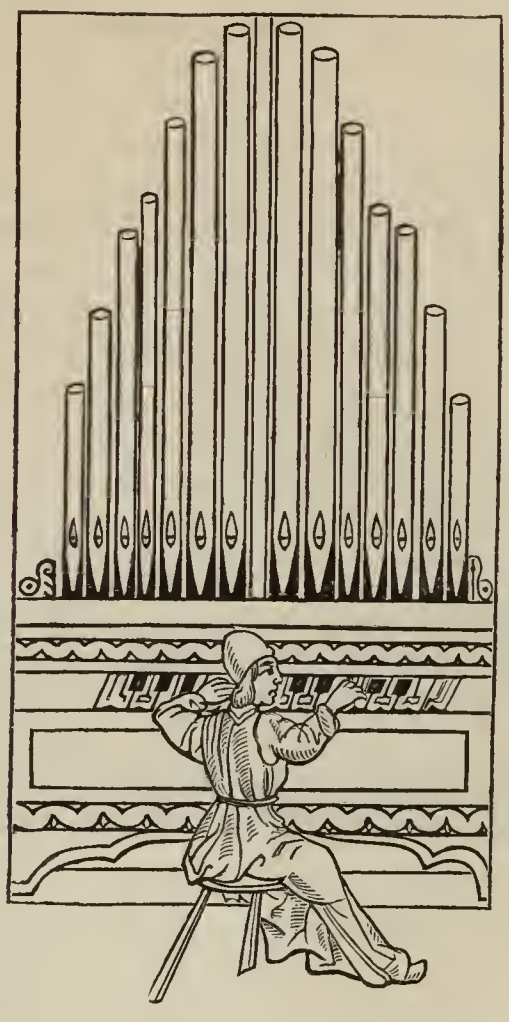
* Burney gives an interesting account of his ascent of one of the belfries at Ghent, to witness a performance on the chimes. "The *Carilloneur*," he says, "was literally *at work*, and *hard* work indeed it must be; he was in his shirt, with the collar unbuttoned, and in a violent sweat. There are pedals communicating with the great bells, upon which, with his feet, he played the base to several sprightly and rather difficult airs, performed with the two hands upon the upper species of keys. These keys are projecting sticks, wide enough asunder to be struck with violence and velocity by either of the two hands edgeways, without the danger of hitting the neighbouring keys. The player had a thick leather covering for the little finger of each hand, otherwise it would be impossible for him to support the pain which the violence of the stroke necessary to be given to each key, in order to its being distinctly heard throughout a very large town, requires."—*Present State of Music in Germany, the Netherlands, &c.* 1775. Vol. i, p. 14. An engraving of a *Carilloneur*, performing in the exact manner described by Burney, may be seen in the fourth book of Mersennus's *Harmonie Universelle:* Paris, 1636.

The annexed very curious engraving, showing an organist performing upon an instrument with broad-keys, is copied from Franchinus Gaffurius's *Theorica Musica,* printed at Milan in 1492*.



7. *The Bellows.*

We cannot but wonder at the perseverance of our ancestors, when we consider the various ineffectual efforts that were made, from time to time, to improve the bellows. For centuries they remained in the most imperfect state—sometimes twenty or more being necessary to supply the wind to a

* This engraving also occurs in the same author's *De Harmonia Musicorum:* Milan, 1518. Mr. Wackerbarth, in his *Music and the Anglo-Saxons* (p. 8), says, "Now it has been so generally asserted by modern writers, though I know not on what authority, that the keys of the organ were originally some inches wide, and played on, like Carillons, with a blow of the fist, that I dare not altogether reject, as untrue, so much concurring testimony." It is presumed that the writer of this passage will accept the names of Dom Bedos, Prætorius, and Gaffurius, as *authorities.*

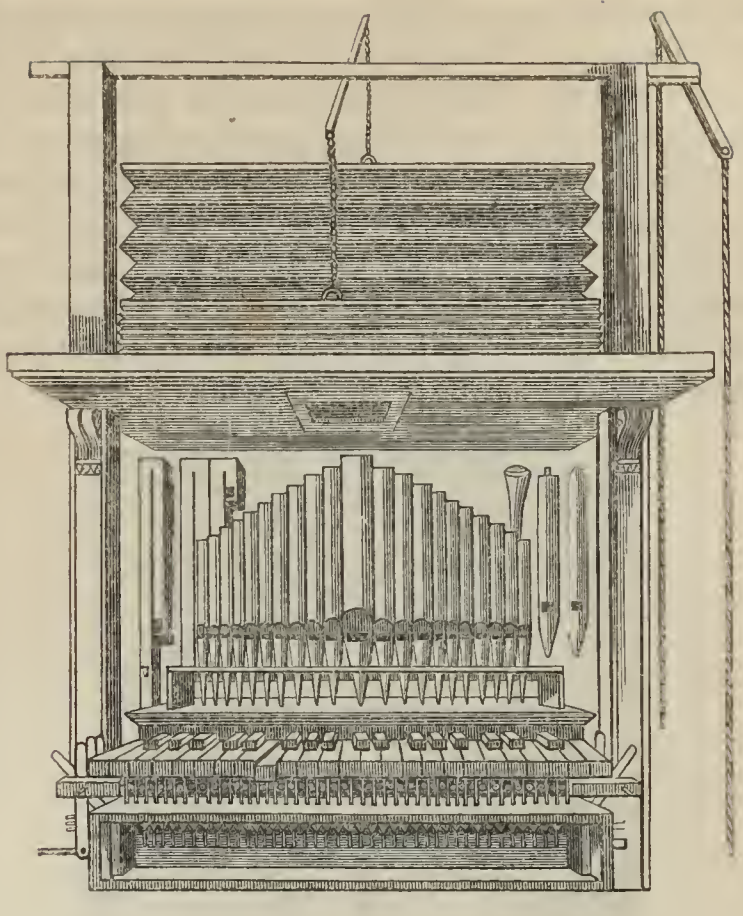
moderate sized organ. According to Wulstan (in the passage before quoted), the organ at Winchester was provided with twenty-six bellows. The great organ of the Cathedral at Halberstadt had twenty, and that of Magdeburg twenty-four small bellows. They were fashioned in folds like the forge or smith's bellows, and were not provided with weights as in our modern organs. Our ancestors had no idea of proportioning the wind; but its force depended solely on the strength of the bellows-blowers. It is easy to conceive that by this means the organ could never have been in tune; because the wind was admitted unequally. Prætorius has left us a singular representation of the ancient mode of blowing, which is here copied from the *Theatrum Instrumentorum*, Wolfenbüttel, 1620:

Upon each bellows is fixed a wooden shoe; the men who work them hang by their hands on a transverse bar, and each man, placing his feet in the shoes of two bellows, alternately lowers one and raises the other.

We copy another curious representation of an early bellows, which is given by Mersennus, in his *Harmonie Universelle:* folio; Paris, 1636. It shows that the *horizontal* bellows, though only brought into general use in the last century, was by no means a modern invention*.

The bellows is here placed at the top of the organ, and worked by a chain in the place of a feeder. Mersennus calls it bellows "à la lanterne."

* The horizontal bellows is an improvement upon the old one; as a column of air by this machine is both supplied and drawn at the same moment, by the action of a crank and other appendages, instead of levers, &c.



8. *Supposed Origin of the Mixture Stops.*

Seidel, in the introduction to his work on the organ*, has the following passage:—"In the twelfth century, the number of keys was increased, and afterwards each note (or tone) multiplied by two, three, or more pipes, tuned to the fifth or octave, or to the third and tenth. By this alteration the organ became a mixture; and so remained until the idea occurred of classifying the pipes, by which means this mixture register received a separate slide." Forkel also, in his *Geschichte der Musik* (part ii, p. 368), says that, even in the oldest organs, the mixture, as associated with $\frac{12}{\frac{8}{5}}$, was introduced, not as a stop or register, for there was nothing of the kind at that period, but as being invariably united to each tone†.

Burney‡ is inclined to ascribe the origin of harmony to this invention.

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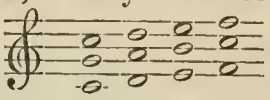
* *The Organ and its Construction, a Systematic Hand-book for Choristers, Organists, Schoolmasters, and Musical Students.* 2nd edit. Breslau, 1844. An English translation of this book has lately appeared.

† Forkel cites Sethus Calvisius and Michael Prætorius, as his authorities.

‡ Hist. of Music, vol. ii, p. 133.

His words are, "With respect to the term *Organum*, as used by musical writers of the middle ages for a voice part; if we could imagine, when the first organ was erected in churches and convents, that each of them was furnished with such a stop as is now called the *Sesquialter*, or any other compound stop, consisting of 4ths, 5ths, and 8ths; thus:  &c. it might not only help to account for the introduction of such strange harmony into the church as that of Hubald, Odo, and Guido, but even give a probable reason for the name by which it was called: for, whether we suppose singers to have imitated such sounds as every *single key* produced, or such as were produced by the fingers from *different keys* of the organ, it was natural to call the part which was added to the plain-song, *Organum*, and the art of producing it, *Organizare**."

Dr. Crotch† is of an exactly opposite opinion. He says, "The method of accompanying the chants of the Christian church by a succession of fifths, octaves, or fourths, used in and before the eleventh century, called Organum, has been supposed to be the origin of harmony. The organ took its name from it; and the stops called cornet, sexquialtera, twelfth, tierce, principal, fifteenth, &c. are thought to have been invented to facilitate the performance of this accompaniment‡. But if the effect of this accompaniment was similar to that of the above stops of an organ,—if, by being performed comparatively soft, it only enriched the tone, without disturbing the melody,—then it should not be considered as the origin of harmony, having no more to do with it than the harmonics which constantly accompany the melody of a single voice or instrument. The invention of harmony may be said rather to have commenced when these fifths, fourths, and octaves begun to be *avoided*."

Kiesewetter, in his charming *History of the Modern Music of Western Europe*§, has the following conclusions on the subject: "But in what manner, then, the organum may nevertheless have been, and really was, an imitation of the organ, and received its name from that instrument, may thus be explained. The oldest organs, of exceedingly coarse manufacture,—the broad six-inch keys of which, separated from each other by a large space, must have been pressed down with the fists or elbows,—were in truth as little adapted to harmonic performances as to harmonic experiments; these instruments may, notwithstanding, have afforded the first opportunity of representing to

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* *Organizare*, according to Du Cange, is *canere in modum organi;* and, among his authorities, he gives the following definition from the *Catholicon* or *Lexicon* of John de Janua, written in 1286: Organizare, *Organo cantare; Joer ou chanter en orgres, organiser;* "to play or sing *like* the organ."

† Note in the second edition of *Elements of Musical Composition*, 1833, p. 33.

‡ This could not have been the case, as these stops were not invented till the *fifteenth* century, when the old *organum* had been discarded for something better.

§ Translated by Robert Müller. 8vo. 1848.

our senses in a permanently continuous manner the physical effects of the then admissible consonances, at least in single unisons, by the pressing down and holding out at the same time a second key: moreover, the organ-'thumper' might, whether intentionally or through awkwardness, have hit upon the idea of causing one key to remain sounding, whilst the singers, to whom he had given the note, proceeded with their melody above it, as in the bagpipes; or it might also have happened that, at one time or another, he would accidentally, perhaps, press down the fifth to the fundamental note, and thus have caused an agreeable surprise by its pleasing effect. With this, indeed, there might not as yet have been a proper harmony discovered; but effects would have been perceived calculated to produce, in speculative musicians, matter for reflection, and for hazarding other systems; the union of different human voices, which now occurred to their thoughts, was an imitation, not altogether happy perhaps, of that which in various instances they had discovered with the organ, and thus their diaphony, or polyphony, received the somewhat appropriate name of organum."

9. *The First Monastic Organs.*

In the thirteenth century, the priests of the Greek and Roman churches thought the use of organs in divine service scandalous and profane. They preferred rendering divine worship as simple as possible, in order to distinguish it from that of the Jews and Pagans. Even to this day, the Greek church does not tolerate the use of organs in their public services. Notwithstanding these opinions, the use of organs, and even other instruments, became almost universal, not only in great churches, but in those of monasteries, convents, and small towns. The historians of this era celebrate several monks, distinguished for the art of playing on the organ, and for their general musical abilities. For some time, however, organs were only used on great feasts and solemn occasions; they were not used in the ordinary celebration of the offices*.

The first monastic and conventual organs were very small, being merely

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* On particular occasions, the performance of a band of minstrels was added to the organ. *Minstrels' galleries* are often seen in the continental churches, but are rarely met with in this country. There is a gallery of this sort over the altar-screen at Chichester Cathedral, and another, much more remarkable, near the middle of the north side of Exeter Cathedral. It is supported on thirteen pillars, between every two of which, in a niched recess, there is a sculptured representation of an angel playing upon some musical instrument. Among these are the cittern, bagpipe, harp, violin, pipe, tambourine, &c. The roof of Outwell church, Norfolk, and the minstrels' column at Beverley, also exhibit a great variety of musical instruments anciently used in churches.

used to play the melody of the plain-song with the voices. These organs were called *Regals*.

10. *The Regal, or Portative.*

The term *regal* or *rigol* appears to have come from the Italian *Rigabello*. Sir Henry Spelman tells us "That in the church of St. Raphael, at Venice, the figure of a certain musical instrument, called a *rigabello*, was to be seen; it was wont to be used in churches before organs came into vogue. Another instrument, called *turcello*, succeeded the *rigabello*, the use of which was introduced at Venice by a German*." This passage clearly shows the word *regal* to be a corruption or contraction of *rigabello*†.

Musical writers have not explained the nature of the *regal*, which was evidently to give out and sustain the melody of the plain-song. Carter, the well-known antiquary, calls it "a portable organ, having one row of pipes, giving the treble notes.‡." A writer in Rees's *Encyclopedia* says that "the *regal*, in all Roman Catholic countries, is a portable organ used in processions, carried by one person, and played upon by another." This explanation is not quite accurate, as the representations in early manuscripts invariably exhibit the instrument carried and performed upon by the same person.

Snetzler, the celebrated organ-builder, remembered the regals in use, in Germany§; and, until near the end of the last century, an officer of the Royal Chapel at St. James's was styled "a tuner of the regalls||."

In the accounts of the *Weavers' Pageant*, performed at Coventry in the sixteenth century, we have the following entries:

"1554. Payd to James Hewet for hys reyggals, viijd.

"1556. Payd to James Hewet for playing of his *regols* in the payggeant, viijd."

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* "In Ædе Sancti Raphaelis Venetiis, instrumenti musici cujusdam forma extat, ei nomen rigabello: cujus in ecclesiis usus fuerit ante organa illa pneumatica quæ hodie usurpantur. Rigabello successit aliud quod Turcello dictum est, cujus Venetias usum induxit homo Germanus."—*Sansovinus*, lib. vi, *Descript. Venetiarum.*

† Skinner, the etymologist, upon the authority of an old English dictionary, conjectures the word Rigals or Regals to signify a stringed instrument,—namely, a clavichord. In this mistake he has been followed by numerous writers. Walther is more particular in his description of the Regal: he makes it to be a reed-work in an organ, with metal and also wooden pipes and bellows adapted to it, so contrived as that it may be taken out and set upon a chest or a table. He says that the name Regal is frequently given to that stop in an organ called the Vox humana; and in this sense Mersennus uses it, in his *Harmonie Universelle* liv. vi, Des Orgues, Prop. viii. See Walther's *Musicalisches Lexicon*, Leipzig, 1732. Cotgrave and Florio write the word *rigols* and *rigoles*.

‡ *Gent.'s Mag.* 1804, Part i, p. 328.

§ See the *Archæologia*, published by the Society of Antiquaries, vol. iii, p. 32.

|| In 1767, Bernard Gates received a salary of 56l. as "tuner of the *regalls*" in the Royal Chapel. The same gentleman, in 1770, is styled "tuner of the *organs*."

The *regals* are mentioned in Edwards' play of *Damon and Pythias*, 1571; and in Jacobo Peri's opera of *Euridice*, composed for the royal nuptials of Mary de Medici with Henry IV of France, in the year 1600.

In the Household Book of the Princess Mary, afterwards Queen Mary*, under the year 1538, we have the following entry:

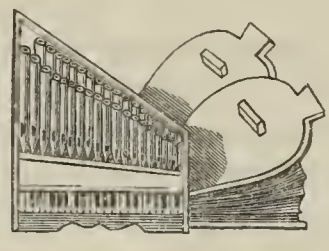
"Item, payd for a payr of regalls, iiij li. x s."

And in an Inventory of Henry the Eighth's Musical Instruments, taken after his death†, we read of "thirteen pair of single regalls," and "five pair of double regalls." *Double* regalls were furnished with two rows of pipes.

Representations of regals of various kinds may be seen in the *Chronicon Nurembergense*, printed in 1493; and in Willemin's admirable work entitled *Monuments Français inédits*.

This instrument is also exhibited among the sculptures in the cornice of St. John's church, Cirencester; and on the crosier of William of Wykcham, preserved in New College, Oxford.

The following early form of the regals is taken from Luscinius's *Musurgia, seu Praxis Musicæ*, Strasburg, 1536:



The regals were also called *portatives*, from the Latin word *portare*, "to carry." The old poets frequently allude to them under this name. Thus Gawin Douglas:

> "On crowd, lute, harpe, with monie gudlie spring,
> Schalmes, clariouns, *portatives*, heard I ring."

Again, in the ancient romance of *Clariodus and Meliades:*

> "The dulcet playit also with *portative*,
> Sad hevie myndis to make exultative."

Also in the poem of the *Houlate*, written in 1450:

> "Clarions loud knellis,
> *Portativis* and bellis."

In the codicil to the will of Richard Fitz-James, Bishop of London, proved 22nd May, 1522‡, is the following bequest:

"Item, I will that my payre of *portatyres*, being in my chapels in the palace of London, mine organs, also being and standing in my chapels within

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* Edited by Sir Frederick Madden, 8vo. 1831.

† See Sir Henry Ellis's *Original Letters, illustrative of English History*, Second Series, vol. i, p. 272.

‡ *Testamenta Vetusta*, by Sir Harris Nicolas, vol. ii, p. 598.

my three manors of Fulham, Hadham, and Wykeham, shall there stand still and remain to my successor, next Bishop of London, that they may be used there to the honor and service of God."

In a curious account of the moveables of certain abbeys, at the dissolution of these establishments (dated 1538)*, we read:

"Item, sold an old payre of *portatyffes* organs to Mr. Besum, ij s."

11. *The Positive.*

In contradistinction to the portative, we have the *positive* organ; from the Latin word *ponere*, "to set down." This instrument was provided with a key-board of full compass, and was of course played upon with both hands†.

In the series of wood-cuts known as the *Triumphe de l'Empereur Maximilian*, drawn by Hans Burgmair, in 1516, and first printed at Vienna in 1796, is an engraving of Paul Hofhaimer, organist to the Emperor Maximilian‡, playing upon a *positive* organ. The instrument is placed upon a table, an attendant blowing the bellows behind; the whole being drawn upon a car, which forms part of the procession. In the descriptive letter-press which accompanies these plates, it is said, "In the car is a *regal* and a *positif*; Paul Hofhaimer, master organist, touches the *last* instrument." The regal may be seen in the same engraving, behind the organist.

The following figure of the *positive* organ is copied from Ambrosius Wilphlingseder's *Erotemata Musices Practicæ*, Nuremberg, 1563.

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* *Letters relating to the Suppression of the Monasteries*, printed for the Camden Society, p. 269.

† Sir John Hawkins says, "It is true when we speak of the organ we are to understand that there are two kinds of instrument distinguishable by that name; the one, for the smallness of its size, and simplicity of its construction, called the *portative;* the other, the *positive*, or immoveable organ; both of these are very accurately described by Ottomarus Luscinius, in his *Musurgia*, printed at Strasburg in 1536. As to the first, its use was principally to assist the voice in ascertaining the several sounds contained in the system, and occasionally to facilitate the learning of any cantus. The other is that noble instrument, to the harmony whereof the solemn choral service has, ever since its invention, been sung, and which is now degraded to the accompaniment of discordant voices in the promiscuous performance of metrical psalmody in parochial worship."—*Hist. of Music*, vol. ii, p. 163.

Sir John has entirely mistaken the nature of the *positive* organ, as will be seen by the passages cited in the text.

‡ Luscinius speaks highly of Paul Hofhaimer. He says "he has received great honours from the Emperor Maximilian, whom he delights as often as he plays upon the organ. Nor is he more remarkable for skill in his profession than for the extensiveness of his genius and the greatness of his mind. Rome owes not more to Romulus or Camillus, than the musical world does to Paulus."—*Musurgia*, 1536. Burgmair's engraving is evidently a good portrait of this eminent musician.

The *positif* was afterwards added to the larger organ. In our musical dictionaries we find it thus explained: "*Positif*, the small organ which is placed before the great one in all churches where there is an organ sufficiently large to be divided into two parts. The organist is placed between the *positif* and great organ, if the claviers or sets of keys are all attached to the great one, and of which the lowest belongs to the *positif**."

We here see the origin of the *choir* organ, which was the *smaller* organ, called the positive, used in monastic times to accompany the voices of the choir. Afterwards, when the organs were joined together, and the organist took his seat between them (or rather in a half-circle taken from the small organ), the *choir*-organ became corrupted into the *chair*-organ†. It has now reassumed its ancient and original signification.

12. *The Meaning of "a Pair of Organs."*

This seems the proper place to explain a term which has frequently puzzled the enquirers after medieval remains; i. e. the common expression of "a pair of organs."

"It appears," says Mr. Albert Way‡, "that the usual term 'a pair of organs' has reference to the double bellows, whereby continuous sound was produced." This, however, cannot be the case; as we often meet with "a pair of *virginals*," in which instrument wind was not required.

Douce§, a high authority in these matters, tells us that a pair of organs meant an instrument "formed with a double row of pipes." This explanation is obviously erroneous; as the *single* regals, always termed "a pair," had but *one* row of pipes. The *double* regals, mentioned in the curious inventory of Henry the Eighth's musical instruments (before alluded to), had two rows of pipes.

Nichols, the learned historian of Leicestershire‖, says, "a pair of organs

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* Danneley's *Musical Encyclopedia*, 1825—a work (in spite of a few errors) of much more merit than is generally assigned to it.

† In one of Matthew Locke's organ pieces, printed in his *Melothesia*, 1673, the "great organ" and the "*chair organ*" are mentioned.

‡ *Promptorium Parvulorum*, published by the Camden Society, tom. ii in v, *Organo*.

§ Cited by Mr. Way, in the before-mentioned work.

‖ *Illustrations of the Manners and Expenses of Ancient Times in England*. 4to. 1797.

was the term at that time, when there were two kinds of organs, the one fixed and the other portable, adapted perhaps to the size of the church and its revenues." A recent writer*, improving upon this statement, adds, "*a payre of organs*, consisting of two organs conjoined, with two sets of keys, one above the other: one small and called *the choir*, or more probably *the chayre* organ; and the other *the great organ*, built, as its name imports, on a large scale, and used in forte passages." This is by far the most erroneous explanation of the term yet given. The slightest acquaintance with ancient documents would have convinced the writer of its absurdity.

Some authorities tell us that "a pair of organs" meant an organ with two stops. But this could not have been the case; as, in Henry the Eighth's Household Book, we read of "a payer of virginalls with *four* stoppes."

The truth is, that "a pair of organs" meant simply an organ *with more pipes than one*. Jonson, Heywood, and other of the older poets, always use the term *pair* in the sense of an aggregate, and as synonymous with *set*: thus we have "a *pair* of chessmen," "a *pair* of beads," "a *pair* of cards," "a *pair* of organs," &c.† When speaking of a *flight* of stairs, we often say a *pair* of stairs. Therefore this ancient form of expression, although obsolete in most cases, is still in *use* at the present day.

13. *The Improved Key-board, and the Invention of the Pedal.*

The Monks and Friars, those zealous guardians and preservers of learning and the fine arts, in the dark times of the middle ages, not only took great interest in the building and adornments of their churches and convents, but employed themselves in making improvements in the art of organ-building.

In the course of the fourteenth century they set about improving the clumsy clavier or key-board. In particular, they made neater keys, increased their number both upwards and downwards, to the extent of nearly three octaves, and so reduced their fall and breadth, that they no longer required to be struck down by the fist, but were capable of being pressed down by the fingers, as in the organ of modern times.

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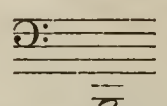
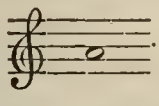
* A paper "On Organs in Churches," by Arthur Ashpitel, in the *Transactions of the British Archæological Association*, 1846, p. 289.

† "A *pair* of cards, Nicholas, and a carpet to cover the table."
A Woman killed with Kindness. Heywood. Printed before 1604.

"Have you ne'er a son at the groom porters to beg or borrow a *pair* of cards?"
Jonson's *Masque at Christmas*, 1616.

"Go, get a *pair* of beads, and learn to pray, sir."
A Wife for a Month. Fletcher. 1624.

"Was there no talk of a fair *pair* of organs, a great gilt candlestick, and a pair of silver snuffers?"—*A mad World, my Masters.* Middleton. 1608.

In 1359 or 1361, Nicholas Faber, a priest, built the great organ in the Cathedral at Halberstadt. It had fourteen diatonic and eight chromatic keys, the compass extending from great  to  The great B stood in front, was thirty-two feet long, and three and a quarter inches (?) in diameter. According to Prætorius*, who gives us this account, this organ had four claviers, one being *pedals* for the feet, and twenty bellows, requiring ten men to supply the wind.

This is the earliest *authentic* account of an organ provided with the semitones of the scale. Dom Bedos†, indeed, tells us that "half-notes were invented at Venice in the twelfth century;" but as his statement is unsupported by proof, we prefer following the *earlier* authority of Prætorius, who assigns their introduction to the middle of the fourteenth century—a period more in accordance with what we know respecting the progress of harmony in the middle ages.

Prætorius is, perhaps, wrong in fixing so early a date for the invention of the pedal. The Halberstadt organ was probably provided with this important addition by Gregorius Kleng, who restored that instrument in 1494.

The invention of the pedal is commonly attributed to a German, named Bernhard, Organist to the Doge of Venice, between the years 1470-80‡; but it was certainly anterior to this date. A writer in the *Leipsic Musical Gazette*, 1836, states that, in the year 1818, a new organ was erected in the church of Beeskow, four miles from Frankfort on the Oder; on which occasion, the organ-builder, Marx (senior), took some pains to ascertain the age of the old organ he had to remove. On a careful investigation, it appeared that the organ had been built just four hundred years, the date of 1418 being engraved on the upper side of the partition *(kern)* of the two principal *pedal pipes;* for that these two pipes did belong to the pedal, was clear from their admeasurement. From this fact, it may reasonably be concluded that the pedal may have been in use towards the end of the fourteenth century. Bernhard probably made some *improvements* in the pedal board which tradition has associated with the invention.

Marinus Sanutus, a celebrated Venetian patrician, and a zealous promoter of Christianity, caused, in 1312, an organ to be built for the church of St. Raphael, in Venice§. This was the first *organ* erected in that city. It was

* *Syntagma Musica*, vol. ii, p. 98.

† *L'Art du Facture des Orgues.*

‡ It is sometimes claimed for Albert Van Os, who is said to have built an organ for St. Nicholas' Church, Utrecht, in 1120. Traxdorf, in 1468, also (with more reason) has his advocates for the invention.

§ This organ had so many admirers in Venice, that Marinus Sanutus received the honorable title of *Torcellus*, organs being at that time called *Torcelli*, in Italy.—*Seidel.*

If this organ was the *first* erected at Venice—and we have reason to believe the state-

probably a large one, and the builder was a German. Hence we see that the Germans, at this early time, had acquired a considerable reputation for organ-building, which had even passed the limits of their fatherland; and it will be observed, in the further progress of these pages, that the great improvements in this instrument almost exclusively proceeded from these thoughtful people.

14. *Monastic Organs in England.*

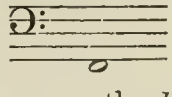
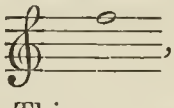
In England, as we have seen, a large organ existed at Winchester in the tenth century; and probably, even at this early period, other cathedrals were supplied in a similar manner. Gervase, the monk, of Canterbury, describing the burning of that cathedral in 1174, mentions the destruction of the organ; but does not allude to it as if it were an unusual thing in a church*. The organs of the Abbeys of Malmesbury and Glastonbury we have already mentioned; and long before the close of the *fourteenth* century, all our abbeys and churches were plentifully supplied with instruments of this class†.

Chaucer, in his tale of the Cock and the Fox, speaking of Chaunticlere, the hero of the poem, says:

> "His vois was merrier than the merry *orgon*,
> On masse days that in the churches gon."

Again, speaking of St. Cecilia, the same Poet says:

> "And while that *organs* maden melodie,
> To God alone thus in her heart sung she."

In the fourteenth century, it became the practice to place two organs in large churches; one large, the other small. The *great* organ was provided with two manuals, from  to  , the upper manual forming the *treble*, the lower one the *bass*. This arrangement, according to Seidel, suggested the invention of the *copula*. The pipes of these instruments were always exposed; and such an organ (according to Fosbroke‡) was, and perhaps is now, at Uley Church, in Gloucestershire. The organist

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ment—it is a sufficient refutation of Dom Bedos' story that "half-notes were invented at Venice in the *twelfth* century."

* Gervas. Dorobern. apud decem Scriptores de incendio, &c. "Organa quæ supra fornicem in australi cruce."

† In Cotton MS. Nero, D. VII, in the British Museum, numerous curious particulars are recorded respecting the use of organs in England; as at St. Alban's, and Croyland, where there were "organa solemnia in introitu ecclesie superius situata," as well as smaller organs in the choir.

‡ *British Monachism; or Manners and Customs of the Monks and Nuns of England*, edit. 1843, p. 204.

was usually one of the monks, when little more was required than to accompany the plain-song or chant. Afterwards, as musical composition improved, and more skill was required for its performance, lay organists were hired*.

Beneath the great niche over the west door of York Minster, is an organ carved in the pediment. The pipes appear without a case: it has a single row of keys, on which an angel is playing, from a music-book held by two small figures of boys or choristers below, while another is behind, blowing the organ with a common chamber bellows. A similar device is carved over a door in the north wall of the Cathedral of Utrecht.

Davies, in his *Ancient Rites and Monuments of the Monastical and Cathedral Church of Durham*, 12mo, 1672†, has left us a curious passage concerning the organs of that monastery: "There were," says he, "three pair of organs belonging to the said quire, for maintenance of God's service, and the better celebrating thereof. One of the fairest pair of the three stood over the quire door, only opened and play'd upon on principal feasts, the pipes being all of most fine wood, and workmanship very fair, partly gilt upon the inside, and the outside of the leaves and covers up to the top, with branches, and flowers finely gilt, with the name of Jesus gilt with gold. There were but two pair more of them in all England of the same making; one in *York*, and another in *Paul's*.

"Also there was a lantern of wood like unto a pulpit, standing and adjoining to the wood-organs over the quire door, where they had wont to sing

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* In ancient times, no distinct officer by the name of organist was appointed in churches or colleges. This duty was subordinate, and appears to have been commonly performed by one of the clerks. In the statutes of Corpus Christi College, at Oxford, given in 1517, two chapel clerks are established; one of whom is also to be the *organorum pulsator*. The first instance of the mention of an organ in any collegiate statutes, occurs in those of Eton College, made about the year 1440; where one of the four clerks who is appointed to instruct the choristers is moreover ordered *jubilare organis*. Here also, for the first time, *Cantus organicus* is mentioned. In the new cathedral-foundations of Henry the Eighth, a master or teacher of the singing boys is appointed: and, besides, he is to be "Cantandi, et organa pulsandi, peritus." At New College, Oxford, King's at Cambridge, and Winchester College, in each of which are ample choirs, there is no provision by statute, not even for an *Informator Choristarum*—although such an officer occurs in the early rolls of New College. At Magdalen College, Oxford, founded about the year 1459, there is also no mention of an organist: but it is enjoined that one of the chaplains, or clerks, or some other skilful person, shall educate the choristers in the plain-chant and pricked song. In the year 1446, the Abbot and Convent of Muchelney, in Somersetshire, granted a corrody of five marks, with seven gallons of ale, and seven loaves, every week, and a gown and four loads of wood annually, to Ralph Drake, cantor, or chanter, *pro servicio* nobis in illa sciencia musica; and on condition that he attend the choir every day, and teach four boys, and one of the monks, or as many as chose, to play on the organ.—See *Warton's Life of Sir T. Pope*, Appendix, p. 425, for further information.

† Compiled from ancient MSS. before the dissolution of the monasteries. J. Davies, of Kidwelly, was the editor. Another edition of this curious volume was printed in 1733, with some additions.

the nine lessons, in the old time, on prineipal dayes, standing with their faces towards the high altar.

"The seeond pair stood on the north side of the quire, being never play'd upon, but when the four doetors of the ehureh were read, viz. Augustine, Ambrose, Gregory, and Jerome, being a pair of fair large organs, called the *Cryers*. The third pair were daily used at ordinary serviee."

In an inventory of the plate, jewels, ornaments, &e. belonging to the late Priory of Ely, Cambridgeshire, we read of "two paer of organs in the quyer," and "a paer of organs in the Ladye Chaple*."

In the aneient Cathedral of Woreester, the ehapel of St. Edmund had a pair of organs; that of St. George, another pair; and in the ehoir was the *great* organ†.

Some of the entries in ancient documents respeeting the organ are interesting, not only as showing its very general use in churches and monastie establishments in the fifteenth and sixteenth eenturies, but also as exhibiting the progress—slow as it evidently was—of the art of organ-building, whilst it remained in the hands of the monks.

In the ehurchwardens' aeeounts of St. Mary's, Sandwieh, are the following:

"1444.	Ress^{d} [Rec^{d}] the bequeth of Thomas Boryner unto a payre of Orgonys	iiij li.
"——	To Sir John‡ for the amendyng of the Organs . . .	xii d.
"1462.	To a Preyst for the amending of the Organys . . .	iiij d.
"——	To a Preist that playth at Organys	iiij d.
"1463.	To Sir John for hys playyng at Organys . . .	vi s. viij d.
"1496.	Payd for mendyng of the lytell Organys . . .	iij s. iv d.
"——	Item, for shepeskyn to mend the grete Organyse . .	iij d.
"1502.	Paid for mending of the gret Organ Bellowis, and the small Organ Bellowis	v d.
"——	Item, for a shepis skyn for both organys, and for trying of the wax for the Paschall	ij d.
"1521.	Payd Winsborough the Monke of Crists Churche [Canterbury] for mendyng the grete Organys . . .	iij. iv d.§"

* Bentham's *History of Ely Cathedral*, p. 225.

† Storer's *English Cathedrals*, vol. iv.

‡ This person was a priest. *Sir* was formerly a designation of an inferior member of the clergy. Bishop Percy says, "Within the limits of my own memory, all *Readers* in chapels were called *Sirs*, and of old have been writ so; whence, I suppose, such of the laiety as received the noble order of knighthood, being called *Sirs* too, for distinction sake had *knight* writ after them; which had been superfluous, if the title *Sir* had been peculiar to them."—See Boswell's *Shakespeare*, vol. viii, p. 8.

§ Some of these entries are printed in Boys' *History of Sandwich*, but without the dates. They are here copied from the original transcripts now in the possession of his grandson, W. H. Rolfe, Esq. of Sandwich.

In the accounts of Shipdam, Norfolk, is this entry:

"1513. Payde to ye Clarke for mendynge ye orgaunys, and he shall take charge of ye pypes and ye bellows ye spaee of ij yeres at hys owne charge . . . . . v s."

Mr. Goddard Jonson, who quotes this entry in his *Illustrations of Ancient Manners, &c. during the 16th and 17th Centuries*, says, in a note, "The organs appear to have been a very considerable annual charge upon the parish, as is shown by the various entries in the books."

In the churchwardens' accounts of Lambeth are the following items:

"1517. Paid to Sir William Argall for the Organs . . . . x s.

"1568. Paid to Father Howe* for his fee for keeping the organes one yere . . . . . i s."

The old accounts of St. Mary at Hill, London, contain, among numerous interesting entries, several notices of the organ: i. e.—

"1519. For bringing the organs from St. Andrew's Church, against St. Barnabas' eve, and carrying them back again† . . . . . v d.

"1521. To the organ maker for a pair of new organs, and for bringing them home . . . . . x s. viij d."

Again, in the old books of St. Andrew Hubbard, Eastcheap:

"1504. Item, payd for mendyng of the organs . . . . . viij d.

"1506. Item, paid to John Smyth, organ plaier, for a quarter ending at our Lady Day in Lent . . . . . v s.

"1568. Paid to Hewe [probably *Howe*, before mentioned], the organ marker, for the kepinge of our orgaynes, his fee, for ij yeres . . . . . v s."

As regards the prices paid for organs in ancient times, we have no very satisfactory information.

Whethamstede, Abbot of St. Alban's, about the year 1450 gave to his church a pair of organs; for which, and their erection, he expended *fifty pounds*. No organ in any monastery in England was comparable to this instrument, for its size, tone, and workmanship‡. About the year 1476, Thomas Wyreester, Abbot of Hyde, near Winchester, gave eight marks and a horse to purchase an organ for his church. "*Octo Marcus et unum equum bonum pro nobis organis musicalibus*§." Organs were sometimes imported

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* This person was also employed in attending to the organ of St. Helen's Church, Bishopsgate. Mr. Burgon, in his *Life and Times of Sir Thomas Gresham* (vol. ii, p. 466), says, "Father Howe's fee for the organes for a hole yere" was 2s."

† It seems to have been customary, in the sixteenth century, for churches to lend their organs. In the accounts of St. Margaret's, Westminster, we read:

"1508. For bringing the organs of the Abbay into the church, and bering them home agayne, ij d."

‡ *Chron. Whethamst.* per Hearne, vol. ii, p. 539.

§ MSS. *Archiv. Wolves.* apud Winton.

from the Continent, as appears by the Louth accounts, about 1500. The price of a pair of *Flemish* organs, suitable to be set up in the rood-loft of that noble church, was 13l. 6s. 8d.* Grey, Archdeacon of Berkshire, bequeathed 4l. in 1521, to St. Mary's Church at Oxford, "for a new payr of organs†." A new organ was bought, in 1529, for the large and beautiful church of Holbeach, in Lincolnshire, for 3l. 6s. 8d.‡ In 1536, the churchwardens of St. Helen's, Abingdon, paid 8l. for "a paire of organs§."

According to Dugdale, an organ was erected in the church of Sutton-Colfield, Warwickshire, by Vesey, Bishop of Exeter, in the reign of Henry the Eighth, at the cost of 14l. 2s. 8d.‖

"A fair payr of organs" was placed in the chapel of Trinity College, Oxford, in 1557, which, "with the carryage from London to Oxford, cost 10l.¶"

These instances could readily be multiplied; but the present are sufficient for our purpose.

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* *Archæologia*, vol. x, p. 91.
† *Registr. Univ. Oxon.* Archiv. A, 166.
‡ Stukely's *Itin. Curios.* p. 20.
§ Nichols' *Illustrations of Expenses, &c.* 1797.
‖ Dugdale's *Warwickshire*, p. 667.
¶ Warton's *Life of Sir T. Pope*, p. 344.

THIRD EPOCH.

THE FIRST ORGAN-BUILDERS BY PROFESSION.

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15. *Early German Builders.*

There can be no doubt that many of the early organ-builders were ecclesiastics. Even down to a comparatively late period, as we have seen by the foregoing extracts, the latter continued to exercise a considerable influence over the art.

It is very difficult to distinguish the first organ-builders *by profession* from the priesthood; but that such existed as early at least as the fifteenth century, there cannot be a question.

Albert Van Os, emphatically called "Albert the Great," the earliest known organ-builder, was certainly a priest; so were his followers, Ulric Engelbrecht and Nicholas Faber. Van Os built the organ of St. Nicholas' Church, Utrecht, in 1120; Engelbrecht, that of Strasburg Cathedral, in 1260; and Faber, that of Halberstadt, in 1359 or 1361, before mentioned.

Heinrich Traxdorf, who built an organ at Nuremberg in 1455, and another at St. Mary Magdalen, at Breslau, in 1466, was propably a *layman;* but this is by no means certain. Erhart Smid, of Peyssenberg, in Bavaria, whom Duke Ernest, in 1433, exempted from every species of impost and contribution, on account of his skill in constructing organs,—and Andrè, who built, in 1456, the organ of St. Ægidia, at Brunswick, were certainly lay-builders.

In 1475, Conrad Rosenburger, or Rothenburger, built an organ in the church of the Barefooted Friars, at Nuremberg; and, in 1493, a still larger one in the Cathedral of Bamberg. The organ in the Cathedral at Erfurt was built, in 1483, by an artist of Breslau, named Stephen Castendorfer; who also built, in 1490, an organ for St. Ulrich's Church, at Augsburg, for 107 florins (£8 : 18 : 4). The great organ in the Collegiate Church of St. Blasius, at Brunswick, was built, in 1499, by Henry Kranx. Prætorius celebrates Frederick Krebs and Nicholas Muller as skilful organ-builders. Probably all these eminent men were organ-builders by profession.

16. *Early English Builders.*

The earliest organ-builder by *profession* in this country, of whom any account has descended to us, is William Wotton, of Oxford, who flourished

in the latter part of the fifteenth century*. An indenture exists, which was made in 1487, between R. Fitzjames, warden of Merton College, and William Wotton, of the town of Oxford, by which he undertakes to make a pair of organs like the organs of the chapel of St. Mary Magdalene College, against the vigil of Whitsunday, 1489, for the price of 28l. The organ in Magdalene Chapel had been set up by him not long before, as appears by an entry in the Libri Computi of that college, for the years 1486-7, of a payment to him of 13l. in part for one pair of organs:—"*Sol. Willielmo Wotton, Orkynmaker, pro uno pari organorum in parte* 13l.;" and, two or three years after, a further payment occurs to him for repairs to this organ—"1488-9, *Sol. Willo. Wotton, pro reparacione organorum* 40s."

John Chamberlyn, or Chamberlaine, and Thomas Smyth, were organ-builders, residing in London, in the early part of the sixteenth century. A payment to the latter, in 1514, is thus recorded in the accounts of the churchwardens of St. Margaret's, Westminster:—"Item, paid to Thomas Smyth, orgone maker, for mendyng of the grete orgones xl s., and for the small orgones v s."

In the list of Henry the Eighth's musical establishment, we find, under the year 1526, the name of "John de John, *organmaker.*" Again, in the king's household-book—"May, 1531. Item, the 2d daye, paid to *Sir* John, the organ-maker, in rewarde, by the king's commandement..... xl s."

This person, who was a *priest*, was succeeded in the royal establishment by William Beton, or Betun, an organ-builder of some pretensions,—if we may judge from the fact of his having built the organ for the old cathedral of St. Paul.

In Rymer's *Fœdera (Pro Capitoli Organista Regis)* is a grant of 20l. sterling per annum to William Betun, bearing date 1537; which annual stipend he appears to have received until the year 1544. He was retained in the royal service by Edward the Sixth and Mary. In the list of the musical establishment of the former, we find—

"Makers of Instruments, { William Beton, *Organ* Maker. William Tresorer, *Regal* Maker†.

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* See Warton's *Life of Sir Thomas Pope*, 2nd edit. Appendix, p. 345; also the Rev. Sir William Cope's valuable paper on "Early Organ Builders in England," inserted in the *Parish Choir*. The writer is indebted for the notices of Chamberlyn and Smyth to the last-named authority.

† There is an exceedingly curious licence preserved in the Cottonian MS. Galba C. 11, fol. 253, from which it appears that "William Treasorer, a maker of musical instruments, his heirs and assigns," had letters patent for eight years, from King Phillip and Queen Mary, dated July the 11th, in the first year of their reign, "to provide and buy within the realm of England, in any place or places, one hundred thousand lasts of ashes, and four hundred thousand dozens of old worn shoes, and export the same to foreign parts." Queen Elizabeth, on the 13th March, in the second year of her reign, confirmed

An eminent English builder of this period was named Wyght, or White. Entries of payments to him for work done to the organ of Magdalene College Chapel, Oxford, occur in the books, from 1531 to 1545. One of them runs thus—

"1531, Magistro White, organorum factore, pro reparat, duorum par organorum in choro."

From the title, *Magister*, here given him, it has been conjectured, with every appearance of probability, that he was the same person as Robert White, a well-known church composer, who may have united the art of constructing organs with his higher musical pursuits*.

John Schowt, or Stut, who flourished in London about the same period, 1529-30, seems, from his name, to have been a German.

A little later, an organ-builder, named Broughe, set up a new organ at St. Margaret's, Westminster, thus noticed in the churchwardens' accounts there:—

"1590, payde to Mr. Broughe, for changeing of our organs for a payre of his.....viij. *li.*"

John Chapington appears to have built an organ for Westminster Abbey, about 1596; at least, we find him in that year selling the old organ of the collegiate church to the churchwardens of St. Margaret's:—

"1596. Paid to Mr. Chapington for the organs of the colledge, xiij l. xiij s. iiij d., and the old organs do remayne in the parish church to be sold by the churchwardens." One organ, at least, of Chapington's, remains to this day, viz. that which he built in 1597, for Magdalene College, Oxford; and of the payment of which a memorandum exists in the Libri Computi of that society.

Impensæ pro organis Mro. Chapington . . .	xxxv l. xiij s. viii d.
Pro color. et deaurat. eadem	ij l. ij s.
Pro wainscot circa eadem	iij l. xiv s.

At the beginning of the following century there was an organ-builder living in London, named Gibbs. Alleyn, the founder of Dulwich College, records in his diary, under the date April 27, 1618, "Bought a pair of organes of Mr. Gibbs, of Powles, 8l. 2s.;" which organs were put up in the College chapel†.

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the same for an additional term of twelve years. Treasorer, as a consideration for the renewed patent, "having devised, and given to the Queen a new Instrument Musicall, sending forth the sound of Flutes and Recorders; and likewise promised and took upon him, at his labour, cost, and charges, to repair and amend before the feast of St. Michael next ensuing the great organs in the Queen's chapel at Greenwich."—Ellis's *Original Letters*, second series, vol. iii, p. 202.

* Sir William Cope's paper, before mentioned. The writer is also indebted to the same authority for the following curious notices concerning Broughe and Chapington.

† See the *European Magazine* for June, 1792, p. 192; and Collier's *Memoirs of Alleyn*, p. 157. From the latter it appears that, a year afterwards, Alleyn had "a dia-

Among the eminent English organ-builders who belong to the seventeenth century, are the names of Preston, of York; Thamar, of Peterborough; Loosemore, of Exeter; and the Dallans', or Dallams', of London.

Of the two first, no particulars, farther than their mere names, appear to have come down to us. Of the latter, our information is not much more.

John Loosemore constructed the organ in the cathedral of his native city, Exeter, very shortly before the restoration of Charles the Second*. This instrument is pointed out as worthy of especial notice, on account of its Double Diapason. The Hon. Roger North, in the *Life of the Lord Keeper Guilford* (mentioning his brother's visit to Exeter), adds:—"His lordship, agreeably to his great mastership of musick, took great notice of the organ in the Cathedral church of Exeter, where the two side columns that carry the tower are lined with organ pipes, and are as columns themselves. His lordship desired the dimensions of the great Double Diapason; and the account, as returned, is thus:

Speaking part, long	20 feet	6 inc.
Nose	4	0
Circumference	3	11
Diameter	1	3
Content of the speaking part . .	3 hogs.	8 gall.
Weight	360 lbs.	

"This is heard plainer at a distance than when near, as also louder; and, behind that, and the other large doubles, are placed large wooden pipes to help them into their sound, which otherwise would come on very slow, or perhaps not at all. One, being near enough, may, by the touch of the hand, discern when it speaks, and when not. How it is tuned, whether by measure or the beats, we were not informed; and, bating their account of it, which was curious and diverting enough, I could not be so happy to perceive that, in the musick, they signified any thing at all, but thought them made more for ostentation than use: for there are terms in sound which will not be exceeded; for, when the vibratory pulses are so slow as may be distinguished, sound vanisheth; which is nearly the case with this great pipe†."

In the Choristers' Singing School, attached to the Cathedral, is a small instrument of the same maker. Its stops, which are all of wood, are as follows:—

Stop Diapason. Twelfth.

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pason stop" put to the organ by a person of the name of Barett, and "other alterations," which cost 5s. 10d.

* On the outside of the instrument is an inscription:—"John Loosemore made this organ, 1665." Henry Loosemore, M. B., organist of King's College, Cambridge (afterwards of Exeter Cathedral), and George Loosemore, M. B., organist of Trinity College, Cambridge, were brothers to our organ builder.

† *Lives of the Norths*, vol. i, p. 246.

Open Diapason.	Fifteenth.
Principal.	Flute.

The compass is C C (short octaves) to C in alt.

The following agreement between Loosemore and a customer is not devoid of interest:—

"February the 1st, 1665. Then made a bargaine wth S^{r} G^{eo} Trevilyan, for an organ wth these stops in it, as follows:—

One Diapason . . .	these in wood.
One Flute	
One Recorde . . .	
One Fifteenth . . .	
One Principall . . .	these in mettle.
One Flagilett	
One Trumpett . . .	
One Shaking Stopp .	

And for this organ I am to have one hundred pound, 20l. whereof at the 25th day of March next, and fourescore residue thereof when the work is finished. "John Loosemore*."

This builder died on the 8th of April, 1681, aged 68†.

There appears to have been three organ-builders of the name of Dallans, or Dallam; i. e. *Robert* Dallam, *Ralph* Dallans, and *George* Dalham.

Robert Dallam was born in 1602, and died in 1665: he was buried in the cloisters of New College, Oxford.

He built the organ in New College Chapel, and the small one in the Music School, Oxford; but his principal work appears to have been the organ in York Minster, destroyed when that noble building was partially burnt. The circumstances connected with its erection were these.

In July, 1632, a fine of £1000 having been laid on Edward Paylor, Esq., for the crime of incest, the Dean and Chapter petitioned the King, who, in November, granted that sum to them, for repairing the church, *setting up a new organ*, furnishing the altar, and maintaining a librarian; whereupon, in March, 1632, articles of agreement were entered into by Dean Scott and the Residentiaries, with Robert Dallam, of London, blacksmith, who engaged to build a great organ for £297, with £5 more for his journey to York; and in

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* See the preface to *A Short Account of Organs built in England from the Reign of King Charles the Second to the present Time.* Lond., J. Masters, 1847. 8vo. The work is published anonymously, but the author is understood to be Mr. Sutton, of Jesus College, Cambridge.

† The following inscription is on his gravestone in the transept of Exeter Cathedral, near the south aisle of the choir:—"Hic jacet spe Resurrectionis Johannes Loosmore, quondam Decano et Capitulo hujus Ecclesiæ Curator fidelissimus: et inter Artifices sui Generis facile Princeps. Sit Organum hoc angustum prope situm perpetuum ipsius Artis et Ingenii Monumentum. Obiit 8° Aprilis An. 1681. Æta. suæ 68."

which the price of each stop is distinctly specified. The following is a copy of this interesting agreement:—

"Articles of agreement, indented, made, concluded, and agreed upon, the one and twentieth day of March, anno dni 1632, and in the eighth yeare of the reigne of our soveraigne Lord Charles, by the grace of God, Kinge of England, Scotland, France, and Ireland, defender of the Faith, &c. Betweene the right worshippfull John Scott, doctor of divinitie, deane of the cathedrall and metropoliticall church of St. Peter of Yorke; Phinees Hodson, doctor of divinitie, chancellor and canon residentiary of the said church; George Stanhope, doctor of divinity, precentor and canon residentiary of the same church; and Henry Wickham, doctor of divinitie, archdeacon of Yorke, and canon residentiary of the said church, of the one party; and *Robert Dallam*, cittizen and blacksmith, of London, of the other party; touchinge the makeinge of a great organ for the said church (as followeth):

"The names and number of the stoppes or setts of pipes for the said great organ, to be new made; every stopp containeinge fiftie one pipes; the said great organ containinge eight stoppes.

"Imprimis two open diapasons of tynn, to stand in sight, many of them to be chased	lxxx *li.*
Item one diapason stopp of wood	x *li.*
Item two principals of tynn	xxiiij *li.*
Itm one twelft to the diapason	viij *li.*
Itm one small principall of tynn	vi *li.*
Itm one recorder unison to the said principall	vi *li.*
Itm one two and twentieth	v *li.*
Itm the great sound-board with conveyances, windchestes, carryages, and conduits of lead	xl *li.*
Itm the rowler board, carriages, and keyes	xx *li.*

"The names and number of stoppes of pipes for the chaire organ, every stopp containeinge fifty one pipes, the said chaire organ containeinge five stoppes.

"Imprimis one diapason of wood	x *li.*
Itm one principal of tynn, to stand in sight, many of them to be chased	xii *li.*
Itm one flute of wood	viij *li.*
Itm one small principall of tynn	v *li.*
Itm one recorder of tynn, unison to the voice	viij *li.*
Itm the sound bord, windchest, drawinge stoppes, conveyances and conduits	xxx *li.*
Itm the rowler board, carriages, and keyes	x *li.*
Itm the three bellowes with winde truncks, and iron workes and other thinges thereto	x *li.*
Sume total	cclxxxxvii *li.*

"It is agreed by and between the parties above said, and the said *Robert Dallam* doth covenant, promise, and grant, for him, his exeeutors and administrators, to and with the said Deane and Canons residentiary above named by these presents, that he the said *Robert Dallam,* his exeeutors or administrators, shall and will well and suffieiently and workemanlike new make and finishe the said organ in every the partieulars before mentioned, aecordinge to the true intent and meaninge hereof, before the feast of the nativitie of Saint John Baptist, whieh shall be in the yeare of our Lord God one thousand six hundredth thirtie foure. In eonsideraeion of whieh worke undertaken to be done as aforesaid, the said Deane and Canons residentiary above named have paid unto the said *Robert Dallam* in hand one hundred pounds, and doe promise to pay unto him the residue of the said sume of celxxxxvii *li.* as soone as the said worke shall be finished; and for the more speedy finisheing of the said worke, the said Deane and residentiaries are pleased to appointe the said *Robert Dallam* some convenient roome neare unto the said Cathedrall church to worke in. And further the said Deane and residentiaries doe promise to pay to the said *Robert Dallam,* towarde the eharge of himselfe and servants in eomeinge from London hither about the said worke, the sume of five pounds. In witnes whereof the parties above said to these present artieles indented have interehangeably sett their hands and seals the day and yeare first above written."

It will be observed that this agreement does not provide for any thing more than the pipes, sound-boards, and three pair of bellows. The aeeount of the ehamberlain, relative to the appropriation of the £1000, is dated 1634; from whieh it appears that a workman from Durham was engaged for fifty-two weeks, at 20s. per week, to build the ease. King Charles visited York in May, 1633, and on the 26th he went to the top of the great tower, at which time it is presumable that he direeted the plaeing of the organ, then reeently eontraeted for, on the north side of the ehoir, whieh conjeeture is strengthened by the entry of charges for work done at the *pillars* to support the organ loft*.

Ralph Dallans built the organ for St. George's Chapel, Windsor, at the Restoration; an organ for the parish chureh, Rugby; and the old organ of Lynn Regis, whieh was removed by Snetzler†. This is all we know of him,

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* Crosse's *Account of the York Musical Festival,* 4to, 1825, pp. 134-5, and Appendix.

† Dr. Burney says, "Part of the old organ at Lynn had been made by Dallans, the rest by some more ancient workman; as the wooden pipes were so worm-eaten as to fall to pieces when taken out to be cleaned. Upon the churchwardens asking Snetzler what this old instrument would be worth if repaired, he said, 'If they would lay out a hundred pounds upon it, perhaps it would then be worth fifty.' "—*Hist. of Music,* vol. iii, p. 438.

The organ which Dallans built for the Royal Chapel at Windsor is still preserved in the church of St. Peter in the East, St. Alban's. A representation of it may be seen in Ashmole's *Order of the Garter.*

except what is contained in the following inscription, formerly existing in the old church of Greenwich:—

"Ralph Dallans, organ-maker, deceased while he was making this organ; begun by him Feb. 1672. James White, his partner, finished it, and erected this stone, 1673."

George Dalham has the following advertisement at the end of John Playford's *Introduction to the Skill of Musick*, 1672 (6th edit.), which is the only record of his having existed:—

"Mr. George Dalham, that excellent organ-maker, dwelleth now in Purple Lane, next door to the Crooked Billet, where such as desire to have new organs, or old mended, may be well accommodated."

17. *Notices of English Organs.*

During the period that these various organ-builders flourished, our cathedrals were being supplied with organs on a much larger scale than those which had been used in the ancient monasteries.

In the British Museum, among the Lansdowne MSS. (No. 213), is preserved *An Account of a Tour made through a great part of England*, A.D. 1634*. This curious MS. contains some interesting notices of organs, which are worth extracting.

"York. There we saw and heard a faire, large, high organ, newly built, richly gilt, carv'd and painted: and deep and sweet snowy row of quiristers."

"Durham. Away then wee were call'd to prayers, where wee were wrapt with the sweet sound and richnesse of a fayre organ, which cost £1000; and the orderly, devout, and melodious harmony of the quiristers."

"Carlisle. The organs and voices did well agree, the one being like a shrill bagpipe, the other like the Scottish tone."

"Litchfield. And no sooner were we lighted, but the Cathedral knell call'd us away to prayers: there we entred a stately, neat fabricke; the organs and voyces were deep and sweet, their anthems we were much delighted with, and of the voyces, 2 trebles, 2 counter-tennors, and 2 bases, that equally on each side of the quire most melodiously acted and performed their parts."

"Hereford. There we heard a most sweet organ, and voyces of all parts, tenor, counter-tenor, treble, and base; and amongst that orderly, snowy crew of quiristers, our landlord guide did act his part in a deep and sweet diapason."

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* The full title is "A Relation of a Short Survey of Twenty-six Counties, briefly describing the Cities and their Scytuations, and the Corporate Townes and Castles therein: observ'd in a Seaven Weekes' Journey begun at the City of Norwich, and from thence into the North,—on Monday, August 11th, 1634, and ending at the same Place. By a Captaine, a Lieutenant, and an Ancient [Ensign]; all three of the Military Company in Norwich."

"GLOUCESTER. Here were wee admiring and whispering till the Cathedrall voyces whisper'd us away to prayers, and so soon as wee heard those voyces and organs, and had view'd their fayrely glass'd and carv'd work cloyster, wee hasted away."

"BRISTOL. In her wee found (besides that fayre and strong fabricke of the Cathedrall, which was newly finish'd) 18 churches, which all are fayrely beautify'd, richly adorn'd, and sweetly kept; and in the major part of them are neat, rich, and melodious organs, that are constantly play'd on. In her [the Cathedrall] are rich organs, lately beautify'd, and indifferent good quiristers."

"WELLS. The Cathedral was beautify'd with ancient monuments and rich organs."

18. *Improvements by German Builders.*

In Germany, and other parts of the continent, the reformer, Ulric Zuingle, had succeeded in banishing, for a time, the use of organs in public worship. But, early in the sixteenth century, this noble instrument was reinstated in the church, and many improvements were made in its construction. It was in this century, according to Prætorius*, that *registers*, by which alone a variety of stops could be formed, were invented by the Germans. Improvements at this period were also made in the pipes, particularly the invention of the *stopped* pipe, whereby expense was saved, and that soft, pleasing tone obtained, which open pipes are unable to yield.

By employing the *small scale*, a number of registers with a penetrating, yet pleasing, tone were obtained, in imitation of the *violin*, *viol de gamba*, &c. By the *large scale*, on the contrary, was preserved that full, round tone which we always hear in good organs. Besides these, certain kinds of pipes were made to *taper upwards*, whereby some other registers were added to the former, such as the *spitz-flute*, the *gemshorn*, &c.

In the course of the sixteenth century, *reed* registers were invented, with which it was sought to imitate the tone of other instruments, and even the voices of men and animals—for instance, the *posaune*, *trumpet*, *shalm*, *vox-humana*, *bears-pipe*, &c.

In the same century the key-board was extended to four octaves; but the lowest octave was seldom or never complete. An instrument of this kind was called an organ with a *short octave*.

In 1570, Hans Lobsinger, of Nuremberg, invented the bellows with one fold, which is still found in old organs. In 1576, an organ with sixty practicable registers and a "back choir" was erected at Bernau, in the Russian province of Brandenberg. This organ, which is still in existence, has forty-eight keys in the manual, and sixteen in the pedal. It has four bellows, each

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* *Syntagma Musica.*

of which is twelve feet long, and six feet wide. The workmanship is said to be masterly, the whole mechanism bearing evidence of the great progress in organ-building at this period.

"Great organs and great organists," says Dr. Burney*, "seem, for more than two centuries, to have been the natural growth of Germany. The organ which is still subsisting in St. Martin's Church, at Groningen, in North Holland, and of which some of the stops are composed of the sweetest toned pipes I ever heard, was partly made by the celebrated Rodolph Agricola, the elder†. And, from that time to the present, the number of organ-builders whose names are well known to the lovers of that noble instrument, in Germany, is hardly credible in any other country. But, to show my English readers what a serious concern the erection of an organ is in this part of the world, I shall close my account of the progress of music in Germany, during the sixteenth century, by relating the manner in which the magistrates of Groningen contracted with David Beck, of Halberstadt, to construct an organ for the castle church of that city.

"In the year 1592, articles were drawn up between the magistrates and organ-builder, in which it was agreed by the former, that, for an instrument, the contents of which were minutely described, a certain sum stipulated should be paid to the latter upon its completion, provided it was approved, after trial and examination by such organists as they should nominate for that purpose. The instrument, in its construction, employed the builder four years; and, in 1596, the most eminent organists in Germany being invited, the names of all those who signed the certificate of approbation, to the amount of fifty-three in number, are recorded in a book called *Organum Gruningense redivivum*, published by Andrew Werckmeister, 1705‡."

19. *Italian Organ Builders.*

The mechanism of the organ appears to have been well understood by the

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* *Hist. of Music*, vol. iii, p. 255.

† A learned priest, born in the year 1442, at Bafflen, a village in Friesland. He is said to have been a prodigy in literature and science. Vossius says he was a great philosopher; that he understood Latin, Greek, and Hebrew, and was a *great musician*. He died in 1485, at Heidelberg, and was buried in the Minorite church of that city, where is the following inscription to his memory:—

"Invida clauserunt hoc marmore fata Rudulphum
Agricolam, Frisii spemque decusque soli.
Scilicet hoc uno meruit Germania, laudis
Quicquid habet Latium, Græcia quicquid habet."

A fine portrait of Rodolph Agricola is preserved at Knole House, in Kent, the seat of Lord Amherst.

‡ This voluminous writer on Music was born in 1645. He held the posts of inspector-general of organs in the Prussian dominions, and organist of the church of St. Martin, at Halberstadt. He died in 1706. His two books, called *Orgel Probe*, contain some interesting notices of the history and construction of organs in Germany.

Italians in early times. The family of the Antegnati, of Brescia, were amongst the earliest famous organ-builders in Italy, in the fifteenth and sixteenth centuries. Zarlino, in his *Institutioni Harmoniche*, fol., Venice, 1558, mentions "Vincenzo Columbi and Vincenzo Colonna, two Italian organ-makers of the sixteenth century, inferior to none in the world." Columbi built the magnificent organ in the church of St. John Lateran at Rome, in 1549, which was afterwards enlarged by Luca Blasi Perugino, in 1600. Perugino built the organ for the church of Constantine at Rome, by order of Pope Clement VIII.; also the organs in the Cathedrals of Orvieto and Trent*.

In later times, Hermann, a Jesuit, acquired considerable fame in this department of art. He built the organ in the Church of St. Ambrogio, at Genoa, in 1648; that in the Carignana Church, in the same city, in 1649; and one of the organs in the Cathedral of Como, in 1650†.

20. *Notices of Foreign Organs.*

In the journals of some of our travellers in the seventeenth century, are scattered many curious notices of foreign organs, a few of which are here extracted.

First,—of Tom Coriat, the "Odcombian traveller," whose *Crudities* were published in 1611. Speaking of the Cathedral of Bergamo, he says, "There are here two very rich paire of Organs on both sides without the Quire, most sumptuously gilt and imbossed, with many very excellent works."

In the Church of the Augustine Friars, in the same city, "they have a wonderfull rich paire of Organs (lately made) and decked with exceeding faire pillars; made indeed but of wainscot, but so curiously handled, that it yieldeth a very faire shew: it is said it shall be all gilt."

At Verona, Coriat says, "The fairest organs that I saw in Italy, or in any other country, are in this domo."

In the Cathedral of St. Mark, Venice, "at both sides of the choir are two exceeding faire payre of Organes, whose pipes are silver, especially those on the left hand as you come in from the body of the church, having the brasen winged lyon of St. Mark on the top, and the images of two angels at the sides: under them this is written in faire golden letters, *Hoc rarissimum opus Urbanus Venetus F.*"

The philosophical John Evelyn, writing in 1641, says, "generally all the churches in Holland are furnished with organs." He speaks of the "organs at Haerlem;" and of that at Vienna (which place he visited in 1644), as being "exceedingly sweet and well-tuned." In 1645, he tells us that the

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* Padre Bonanni's *Gabinetto Armonico*, 4to. Rome, 1722.

† In the eighteenth century there were in Italy many celebrated organ-builders, amongst whom, Serassi, of Bergamo, and Callido, of Venice, each constructed upwards of *three hundred* organs.

organ at the Columna at Rome, is "accounted one of the sweetest" in that city. Mentioning the Cathedral at Milan, in 1646, he adds, "here are two very fair and excellent organs."

Sir John Reresby, in his Travels (in the middle of the seventeenth century), says, "at Venice are reckoned seventeen hospitals, sixty-seven parish churches, fifty-four convents of friars, twenty-six nunneries, eighteen oratories, and six schools. In these churches are the bodies of fifty saints, *one hundred and forty-three pair of organs*, &c. Speaking of the Church of Santo-Croche, at Florence, he observes, "the making of an organ in this church, besides the materials, cost *four thousand crowns*."

William Carr, "gentleman, late consul for the English nation in Amsterdam," in his *Remarks of the Goverment of severall parts of Germanie*, &c., 12mo, 1688, makes mention of several interesting particulars concerning organs. In allusion to the city of Amsterdam, he says, "I will not say much of her churches, but only that they are in general large and well built. In one of them the States have spared no cost to exceed the whole world in three things, (viz.) an organ with sets of pipes that counterfeit a corus of voyces; it hath 52 whole stops, besides halfe stops, and hath two rowes of keyes for the feet, and three rowes of keyes for the hands. I have had people of quality to heare it play, who could not believe but that there were men or women above singing in the organ, until they were convinced by going up into the organ roome," &c. At Hamburgh, the same writer tells us, "The churches are rich in revenues, and ornaments, as images and stately organs, wherein they much delight. They are great lovers of musick; in so much that I have told 75 masters of severall sorts of musick in one church, besides those who were in the organ-gallery. Their organs are extraordinarely large. I measured the great pipes in the organs of St. Catherine and St. James's Churches, and found them to be 3 foot and 3 quarters in circumference, and 32 foot long; in each of which organs there are two pipes, 5 foot and 8 inches round." At Haerlem, we are told, "Here is one of the fairest and largest churches of the 17 provinces; in the walls whereof there remain to this day sticking, canon bullets, shot by the Spaniards during the siege thereof. In this church are three organs."

21. *The Ancient Position of the Organ.*

Though it is not the object of this work to enter upon the subject of the ecclesiastical fitting-up of the chancel or choir, it will not be out of place to say a word or two as regards the *ancient* position of the organ*.

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* It will be right to mention, that a pamphlet has lately appeared, entitled, *Choirs and Organs; their proper Position in Churches;* by William Spark, Organist and Choir Master, Leeds. The brochure is merely an expression of the writer's *opinion* on the subject. He concludes, "that, as historical data *do not* furnish any uniform rule for our

In the medieval ages, this instrument was placed on one side of the choir; a position which seems to have been almost universal throughout Europe. Gervase, the monk of Canterbury, whose curious account of the burning of that Cathedral, in 1174, has descended to our times*, informs us, that the organ stood upon the vault of the south transept. After the rebuilding of the Cathedral, the instrument was placed upon a large corbel of stone, over the arch of St. Michael's Chapel, in the same transept†. In Dart's view, the organ is shown on the north side of the choir, between the pillars three and four; where it still remained in the time of Dr. Burney.

The organ in the old Cathedral of St. Paul, was placed under one of the north pier arches of the choir, just above the stalls; having a choir organ in front, and shutters to close in the great organ. The case was gothic, with a crocketted gable‡. It occupied the same place during the Protectorate, and was destroyed in the great fire of 1666.

The organ of Westminster Abbey, upon which Purcell played, stood on the "north side of the choir," over the stalls; and seems, from the view of it in Sandford's *Coronation of James II*, to have been a small instrument with diapered pipes§.

At York, the Cathedral organ, built by Dallam, in 1632 (before mentioned), was, by the express command of Charles the First, placed on the "north side of the choir," nearly opposite the bishop's throne. The reason given by the king was, that (placed on the screen which divides the choir from the nave) the organ was an impediment in viewing the interior of the church. King Charles's judicious decision was put aside in the year 1690, when Archbishop Lamplugh ordered the instrument to be removed to the stone screen||.

The organ of Winchester Cathedral, erected at the Reformation, was placed upon the screen between the nave and choir. It was removed, by the order of Charles the First, to the "north side of the choir¶."

At Chester Cathedral, says Burney, "the small primitive organ is still

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guidance in the locating organs and choirs," we are justified in placing them just where we please.

* Dart's *Canterbury Cathedral*, p. 7; and *Gentleman's Magazine* for 1772.

† A representation of this corbel, with the organ as it then stood, over the screen, may be seen in Britton's *Canterbury Cathedral*, pl. iv. The corbel has since been removed.

‡ See an engraving of the choir, showing the organ, in Dugdale's *St. Paul's*.

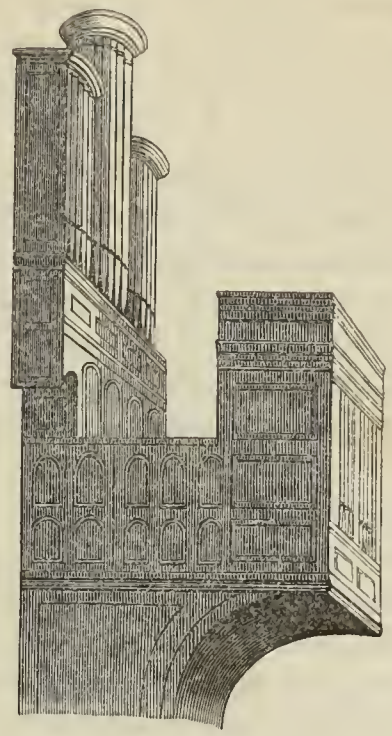
§ It would be interesting to know what became of this organ, hallowed by the fingers of Purcell. One account is, that, when it was removed from the Abbey, in 1730 (the date of the present instrument), it was given or sold to the parish of St. Margaret's, Westminster; and the remains of it, after lying for many years in the tower, were disposed of by the churchwardens, some thirty or forty years ago. Another account is, that it was removed to Vauxhall Gardens; and is, in fact, the instrument still in the orchestra of the royal-gardens.

|| Crosse's Account of the *York Musical Festival in* 1825.

¶ Milner's *History of Winchester Cathedral.*

standing on the left side of the choir, though that which is now used is at the *west* end*."

In the interior view of Lincoln Cathedral, in Dugdale's *Monasticon*, the organ is shown on the north side of the choir, above the stalls; a copy of which is here given.



The organ of Rochester Cathedral (styled an "*old* instrument," as far back as 1668), stood in the north transept. It remained in that situation in 1791, when it was taken down, and the present organ erected on the screen†.

In Durham Cathedral, the "large organ," erected at the Reformation, occupied a place on the north side of the choir, and it is so depicted in Hollar's rare engraving of the interior of this cathedral.

Previously to the year 1550, the "great organ" of the Cathedral of Worcester stood at the side of the choir‡; and such undoubtedly was the situation of the other cathedral organs, of which the writer's industry has not succeeded in finding a record.

The practice of placing the organ at one side of the choir existed also in our college chapels.

At New College, Oxford, the organ given by William Port, in 1458, stood at the stall end of the "north side of the choir," near the vestry, supported by pillars§. This instrument was destroyed by the rebels in 1646. The

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* *History of Music*, vol. iii, p. 440.

† MS. Archives of Rochester.

‡ MS. Archives of Worcester.

§ MS. Archives of New College.

present organ (improved by Green) was erected by Dallam, in 1663; but the beautiful screen upon which it is placed (without any design of supporting the organ) was constructed in 1636*.

Previously to the year 1740, the organ of Magdalene College, Oxford, stood on the "south side of the choir†."

The organ of St. John's College, in the same university, built in 1660, was placed in a little ante-chapel "on the north side of the choir‡." It was in that situation in 1768, when Byfield erected an organ on the present screen.

Quaint old Thomas Fuller, speaking of the Cambridge Colleges, under the date 1633, adds, "Now began the university to be much beautified in buildings; every college either casting its skin with the snake, or renewing it with the eagle..... But the greatest alteration was in their chapels, most of them being graced with the accession of organs§."

The organ of Christ's College still remains on the south side of the choir; and tradition assigns similar situations for the instruments of King's College, St. John's College, &c.

The same position, "at the side of the choir," is still retained in Winchester College; the Royal Chapels at St. James's and Hampton Court; and within memory it was so in Christ's Church, Dublin‖.

As regards parish churches, the common situation for the organ, both before and after the Reformation, was in the chancel¶.

Adam de Shakelsthorpe, by will, dated 1376, gave his organ, "then standing in Cawston Chancel," to Hickling Priory, Norfolk**. And, at a later date, George Preston, Esq. repaired the chancel of Coutmel Church, Westmorland, "at his own great cost," in the year 1590, "and placed therein a paire of organs of great valewe."

The author of the Oxford *Glossary of Architecture*, edit. 1840, thus speaks of the ancient position of the organ:—"The large instruments now in use were not put up in their present conspicuous situation, in the place of

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* Warton's *Life of Sir T. Pope*, p. 344.

† MS. Archives of Magdalene College.

‡ Warton's *Life of Sir T. Pope*, p. 344.

§ Fuller's *History of the University of Cambridge*, folio, 1655.

‖ The Rev. John Jebb, *On the Choral Service of the Church*, p. 197.

¶ Of course other positions were occasionally adopted. In Neale's *Views of the Churches of Great Britain* (vol. ii), there is an extract from a MS. account of Melford Church, in Suffolk, written about the time of the Reformation, in which the following notice occurs: "There was a fair Rood Loft with the Rood, Mary and John, of every side, and with a fair pair of Organs standing thereby." In Britton's *Arch. Antiq.* (vol. iv), the agreement for building the Beauchamp Chapel at Warwick, in the fifteenth century, is quoted; where the carpenter covenants to make a parclose of timber about an organ to stand over the west door of the chapel. See Jebb, *On the Choral Service*, p. 197, *note*.

** Blomefield's *History of Norfolk*, edit. 1805, vol. vi, p. 263.

the ancient rood-loft, until after the Reformation. On the continent, they were also introduced in the course of the seventeenth and eighteenth centuries; but were usually placed at the west end of the church. In this country, previously to the Reformation, the organ was frequently placed on the north side of the choir, or in the north transept."

From the instances we have quoted, it will be seen that, in England, the present usual position of the organ over the choir screen does not appear to have been *general* till the Restoration.

On the continent, the large organs are invariably placed in "lofts;" some at the west end, some over the doors, and very often against one of the piers. We particularize *large* organs, because it is a rare thing to find a church on the continent, of any pretensions, without its two, three, four, and sometimes *six* organs.

The Duomo at Milan has two large organs, one on each side of the choir; so also has the Duomo at Verona. The church of St. John, in Monte, at Bologna, has two "immense" organs in similar situations. At Florence, the two organs are placed in the north-east and south-east of the octagon.

The church of San Antonio, at Padua, has *four* large organs. At the entrance into the choir, the majestic appearance of these instruments is very striking. The front pipes are of tin, highly polished, and have the appearance of burnished silver. The frame-work is richly carved and gilt; there are no panels to the frames, but the pipes are seen on three sides of a square*. These four organs exactly correspond in internal as well as external arrangement.

The church of St. Mark, at Venice, possesses *six* organs; two very large ones, and four small portable instruments that are used in the various chapels.

The only organs in St. Peter's, at Rome, were (and perhaps still are) two moveable ones on wheels, in the side chapels. The distance between the west door and the great altar is wholly a free and unbroken space.

At Ratisbon, the organ is placed behind the high altar; an arrangement totally unworthy of this magnificent structure. The organ of the *Frauen Kirche*, or great Lutheran Church of our Lady, at Dresden (one of the finest of old Silbermann's), is also placed at the *east* end of the church, over the communion table†.

At Treves there is a small organ on the north side of the choir, and a larger one at the west end.

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* Burney's *Present State of Music in France and Italy*, p. 129.

† The organ is in a similar situation in the chapels of Versailles and the Tuilleries; and, in England, at Little Stanmore, near Edgware. The latter is very slightly raised above the communion table, and is viewed through an arch, supported by Corinthian columns.

The organ of the Collegiate Church of Notre Dame, at Courtray, is disposed of in a very singular manner: it is placed in a gallery at the west end of the building; but, in order to preserve the window, which is necessary to light the body of the church, the organ is divided in two parts, one of which is fixed on one side of the window, and one on the other. The bellows run under the window and communicate with both parts of the instrument. The keys are in the middle, under the window*. The organ at the Jesuit's Church, in Ghent, is disposed in a similar way: in fact, it is no uncommon thing in the German and Flemish churches to divide the organ, in order to preserve a window†.

The organ in the church of St. Bavo, Ghent, is placed under the arch of the left side aisle, at the entrance into the choir.

The Cathedral of Antwerp contains three organs; one very large, on the right hand side, at the west end of the choir; and two small ones, in chapels on each side of the broad aisle.

The Cathedral of St. Stephen, at Vienna, has *five* organs; a large one at the west end of the church, and four smaller ones in various chapels.

The Cathedral of Prague has three organs: the large organ, at the west end of the church, is only used on the great festivals of the year; the two smaller organs are used alternately on common days.

At Strasburg, the magnificent organ of Silbermann's is on the left side of the nave, about fifty feet above the pavement‡.

The organ at Amiens Cathedral (perhaps the oldest in France) was built in 1492, at the expense of Alphonso de Myhre, one of the chamberlains to

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* Burney's *Present State of Music in Germany*, &c. p. 12.

† The fine church of St. Nicholas, at Prague, has an organ at the west end, arranged in this manner. The frame-work, pillars, base, and ornaments of this instrument are of white marble.

‡ "A word now about the great *Organ*. If Strasbourg has been famous for architects, masons, bell-founders, and clock-makers, it has been not less so for organ-builders. As early as the end of the thirteenth century, there were several organs in the Cathedral, very curious in their structure, and very sonorous in their notes. The present great organ, on the *left side* of the nave, on entering at the western door, was built by Silbermann, about a century ago, and is placed about fifty feet above the pavement. It has six bellowses, each bellows being twelve feet long and six wide; but they are made to act by a very simple and sure process. The tone is tremendous—when all the stops are pulled out—as I once heard it, during the performance of a particularly grand chorus! Yet is this tone mellow and pleasing at the same time. Notwithstanding the organ could be hardly less than three hundred feet distant from the musicians in the choir, it sent forth sounds so powerful and grand, as almost to overwhelm the human voice with the accompaniments of trombones and serpents. Perhaps you will not be astonished at this, when I inform you that it contains not fewer than two thousand two hundred and forty-two pipes. This is not the first time you have heard me commend the organs upon the continent."—Dr. Dibdin's *Tour in France and Germany*, 2nd edit. vol. ii, p. 392.

Charles VI. It is placed over the entrance to the nave, at the western extremity, thus allowing the eye to embrace the whole structure at one view.

At Chartres Cathedral, the organ is placed over the sixth arch of the nave on the southern side, and at the height of the triforium, or gallery, which is continued all round the church. This organ was built in 1513, and was originally placed over the great western doorway.

In the church of St. Roch, at Paris, there are four organs; but *the* organ of the church stands over the west door.

22. *The Curiosities of Organ-Building.*

Foremost among the instruments demanding a place in this category, are the organs of the Byzantine Emperor, Theophilus, who reigned from 829 to 841.

This renowned patron of poetry and music is said to have had "two great gilded organs, embellished with precious stones and golden trees, on which a variety of little birds sat and sung, the wind being conveyed to them by concealed tubes."

Prætorius tells us that a certain Duke of Mantua received from a Neapolitan artist an organ of which the keys, pipes, key-board, nay, even the outside of the bellows, were of alabaster.

Dr. Powell, in his curious volume, *Humane Industry, or a History of the Manual Arts,* 12mo. 1661, alludes to this organ in the following passage, which also makes mention of some other "curiosities of organ-building:"

"A Neapolitan artizan made a pair of organs all of alabaster stone, pipes, keys and jacks, with a loud lusty sound, which he afterwards bestowed upon the Duke of Mantua, and which Leander Alberti saw in the said duke's court, as he relates in his description of Tuscany. The same Leander saw a pair of organs at Veniec made all of glass, that made a delectable sound. This is mentioned also by Mr. Morison, in his Travels . . . . Gandentino Merula, in his 5th book *de Mirabilibus Mundi,* makes mention of an organ in the church of St. Ambrose in Milan, whereof the pipes were some of wood, some of brass, and some of white lead; which, being played upon, did express the sound of cornets, flutes, drums and trumpets, with admirable variety and concord."

Ertel, who, in his celebrated *Atlas,* deseribes the treasures of the Bavarian Electorate Court Chapel, relates that the organ was of ebony, and ornamented with many precious stones; the keyboard "glittered with pearls," and the bellows were "covered over with silver." And we are told that in the convent of the Escurial, near Madrid, are eight organs, one of which is of *solid silver**.

The author of a rare volume published at Bologna in 1590, under the

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* Amongst the odd materials used by the old builders for organ-pipes, we may add to those mentioned in the text, paper, burnt clay, porcelain, &c. Those who are curious in such matters may consult Jacob Adlung's *Musica Mechanica Organoedi:* 4to. Berlin, 1768: Part 1, Sections 85, 86, and 87.

title of *Il Desiderio,* mentions some curious musical instruments that he saw in the palace of the Duke of Ferrari. He says some were preserved there for the sake of their antiquity, and others in respect of the singularity of their construction. Among these, he takes notice of a curious organ formed to the resemblance of a screw, with pipes of box-wood all of one piece like a flute; and a harpsichord, invented by Don Nicola Vicentino, surnamed Archimusico, comprehending in the division of it the three harmonic genera. He adds, that the multitude of chords in this astonishing instrument rendered it very difficult to tune, and more so to play; and that, for this latter reason, the most skilful performers would seldom care to meddle with it: nevertheless, he adds, that Luzzasco, the chief organist of his highness, who it is supposed must have understood and been familiar with the instrument, was able to play on it with wonderful skill. He says that this instrument, by way of pre-eminence, was called the Archicembalo; and that after the model of it two organs were built; the one at Rome, by the order of the Cardinal of Ferrara; and the other at Milan, under the direction of the inventor.

Don Nicola is reported to have died of the plague, in or about the year 1575, soon after the latter instrument was finished.

Father Bonanni, in his singular collection of engravings of musical instruments, entitled *Gabinetto Armonico,* 4to, Rome, 1722, gives a representation of a curious organ, fabricated by Michele Todino, of Savoy, for Signor Verospi, of Rome. It seems to be an organ with three "Spinette" attached to it; the description tells us that they may be used "separately," or "all together." The worthy priest calls it a "prodigious artifice;" but we question its claim to anything more than a mere curiosity.

Worthy Master Mace's "*Chamber* Organ," made by himself, at his house in Cambridge, of which he gives an engraving in his *Musicks Monument,* fol. 1676, certainly comes under our notice in this place. His own account of the instrument is too quaint to be omitted: "Now as to the description of This Table Organ, I cannot more conveniently do it, than first, in giving you a view of it, by this figure here drawn, and then by telling you all the dimensions, and the whole order of it (I mean my Second, which is the Largest and the best), and take as here followeth. Two of such organs only (I believe) are but as yet in Being, in the World; They being of my own contrivance; and which I caus'd to be made in my own House, and for my own Use, as to the maintaining of Publick Consorts, &c.

"It is in its Bulk and Height of a very Convenient, Handsom, and Compleat Table Seize; (which may Become and Adorn a Noble-Mans Dining Room) all of the Best sort of Wainscot. The Length of the leaf 7 foot and 5 Inches; the breadth 4 foot and 3 inches; the Height 3 Foot, Inch, and Better.

"Beneath, the Leaf, quite Round, is Handsom Carv'd, and Cut-Work, about 10 inches Deep, to let out the Sound: And beneath the Cut-Work Broad Pannels, so contriv'd, that they may be taken down at any time, for the

amending such faults as may happen; with 2 shelv'd cubbords at the end behind, to lock up your Musick Books, &c. The Leaf is to be taken in 2 pieces at any time for conveniency of Tuning, or the like, Neatly Joyn'd in the Midst.

"The Keys, at the upper End, being of Ebony, and Ivory, all cover'd with a Slipping Clampe, (answerable to the other End of the Table) which is to take off at any time, when the Organ is to be us'd, and again put on, and Lock'd up; so that none can know it is an Organ by sight, but a Compleat New-Fashion'd Table.

"The Leaf has in it 8 Desks, cut quite through very neatly (answerable to that Up-standing One, in the Figure) with Springs under the Edge of the Leaf, so contriv'd that they may Open and Shut at pleasure; which (when shut down) Joyn closely with the Table-Leaf; But (upon occasion) may be Opened and so set up (with a spring) in the manner of a Desk, as your Books may be set against Them.

"Now the Intent of Those Desks, is of far more Excellent use, than for mere Desks; For without those Openings, your Organ would be but of very slender use, as to Consort, by Reason of the Closeness of the Leaf; but by the help of them, each Desk opened, is as the putting in of another quickning, or enliv'ning stop; so that, when all the 8 Desks stand open, the Table is like a Little Church Organ, so sprightfully lusty, and strong, that it is too loud for any ordinary private use; but you may moderate that, by opening only so many of those Desks as you see fit for your present use.

"There are in this Table Six Stops, the first is an Open Diapason; the second a Principal; the third, a Fifteenth; the fourth, a Twelfth; the fifth, a Two-and-Twentieth; and the sixth, a Regal. There is likewise (for a pleasure and light content) a Hooboy Stop, which comes in at any time with the foot; which stop (together with the Regal) makes the voice Humane.

"The bellows is laid next the ground, and is made very large, and driven either by the foot of the player, or by a cord at the far end."

A passing notice of the grotesque decorations and machinery of old organ-cases is worthy of a corner in our cabinet of "curiosities." Seidel has a capital passage on this point. He says, "In the course of the seventeenth and early part of the eighteenth centuries, great industry and expense was bestowed upon the external decoration of the organ. The entire case was ornamented with statues, heads of angels, vases, foliage, and even figures of animals. Sometimes the front pipes were painted with grotesque figures, and the lips of the pipes made to resemble lion's jaws. This, perhaps, might have been tolerated, as in the course of time such artifices would naturally be rejected as useless and inappropriate. But people went farther, and threw away the money which might have been expended in a worthier manner on the display of the most tasteless and absurd tricks of art, degrading thereby—doubtless unintentionally—a noble instrument, intended for sacred purposes, into a *raree-show*. Among these ornaments, the figures of angels played a very conspicuous part; trumpets were placed in their hands, which by means

of mechanism could be moved to and from the mouth*. Carillons too and kettle-drums were performed upon by the moveable arms of angels. In the midst of this heavenly host, sometimes a gigantic angel would be exhibited hovering in a glory over the organ, beating time with his baton as the conductor of this super-earthly orchestra!

"Under such circumstances, the firmament of course could not be dispensed with. So we had wandering suns and moons, and jingling stars in motion. Even the animal kingdom was summoned to activity. Cuckoos, nightingales, and every species of bird, singing, or rather chirping, glorified the festival of holy Christmas, and announced to the assembled congregation the birth of the Redeemer. Eagles flapped their wings, or flew towards an artificial sun†. The climax, however, of all these rarities was the *fox-tail!* It was intended to frighten away from the organ all such inquisitive persons who had no business near it. Thus, when they pulled out this draw-stop, suddenly a large fox-tail flew into their faces! It is clear that by such absurd practices, curiosity was much rather excited than stopped, and that all this host of moving figures and their ridiculous jingling disturbed meditation, excited the curiosity of the congregation, and thus disparaged the sublimity of Divine Service."

These absurd doings were not peculiar to the continent: records of such practices (although not to the full extent) formerly existed in England.

A correspondent of the *Gentleman's Magazine*, 1772, p. 562, who signs himself W. L. [William Ludlam], says: "The old organ at Lynn, in Norfolk, had on it a figure of King David playing on the harp, cut in solid wood, larger than the life: likewise several moving figures which beat time, &c."

Dr. Donne, the eminent English satirist, alludes to these moving figures, evidently as no uncommon thing in his days. His words are—"As in some organs, puppets dance above, and bellows pant below which them do move.‡"

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* We must confess that we do not admire the "loud, uplifted angel-trumpets" on the case of the Antwerp Cathedral organ one whit more than the Gorgons and Hydras on that of the Dominicans' Church in the same city.

† Seidel seems to have had in view the ludicrous *outside* of the organ in the Garrison Church, Berlin. Burney, in his entertaining *Tour in Germany* (p. 104), describing his visit, says, "I found a large organ in this church, built by Joachim Wagner; it is remarkable for compass, having 50 keys in the Manuals, and for its number of pipes, amounting to 3220; but still more so for the ornaments and machinery of the case, which are in the old Teutonic taste, and extremely curious. At each wing is a kettle drum, which is beat by an angel placed behind it, whose motion the organist regulates by a pedal; at the top of the pyramid, or middle column of pipes, there are two figures representing Fame, spreading their wings when the drums are beat, and raising them as high as the top of the pyramid; each of these figures sounds a trumpet and then takes its flight. There are likewise two suns, which move to the sound of cymbals, and the wind obliges them to cross the clouds; during which time, two eagles take their flight as naturally as if they were alive."

‡ Johne Donne, his Satires, Anno Domini, 1593." This curious work is preserved among the Harleian MSS. (No. 5110) in the British Museum.

When these figures were abolished, the organ-builders (perhaps in complianee with an absurd canon) set up the royal arms on the front of the organ; and in place of the angel beating time, or King David playing on the harp, we had the British lion, with goggle eyes and shaggy mane, grinning enough to frighten each member of the eongregation from the house of prayer. Let us rejoiee that these abominations no longer exist in our own country*. If they are still oeeasionally to be met with on the eontinent, the inereased feeling of true devotion will soon number them among the things that were.

23. *The Destruction of Organs in England during the Great Rebellion.*

An ordinance being passed in the House of Lords, dated January 4th, 1644, establishing a new form of divine worship, in which no music was allowed but plain psalm-singing, it was thought necessary, for the promotion of true religion, that no organs should be suffered to remain in the churches†; that choral books should be torn; painted glass windows broken; sepulchral brass inseriptions defaeed; and in short, that the eathedral serviee should be totally abolished. In eonsequence of this ordinanee, eollegiate and parochial churehes were stripped of their organs and ornaments: some of the instruments were sold to private persons, who preserved them; some were totally, and others but partially, destroyed; some were taken away by the elergy in order to prevent their being destroyed, and some few were suffered to remain‡.

The puritanical spirit whieh doomed *organs* to destruetion had long been gaining ground. Even as early as the reign of Elizabeth (Aug. 18, 1589), it was agreed, at a parish meeting of St. Chad's, Shrewsbury, "that for the better providing and aeeomplishing the reparation of the bells, feneing the ehureh-yard, and purehasing one decent and semely euppe of silver for the use of the Communion, the *organs should be sould* to any of the parishe

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* There is great room for improvement in organ-cases in England. We may walk many a weary mile without seeing a truly catholic design. Mr. Faulkener published, in 1838, a volume of *Designs for Organs;* but they are little more than an echo of what we see every day. Of a far different character are the designs of the late Mr. Pugin, appended to Mr. Sutton's *Short Account of Organs built in England*, &c. 1847. But then these would be termed *Roman* Catholic.

† A copy of the ordinances preserved in the library of the London Institution has the following title:—"Two Ordinances of the Lords and Commons assembled in Parliament, for the speedy demolishing of all organs, images, and all matters of superstitious monuments in all Cathedralls, and Collegiate or Parish-churches and Chapels, throughout the Kingdom of England and the dominion of Wales; the better to accomplish the blessed reformation so happily begun, and to remove all offences and things illegal in the worship of God. Dated May 9th, 1644."

‡ See an article on the Organ of St. Paul's Cathedral, in the *Musical Gazette*, No. 1. Jan. 1819.

for the sume of £4, if any desyred the same: otherwise the said organs should presentlye bee sould to hym whosoever would give £4 or more for the same!"*

Some idea of the devastation committed by the Puritans upon organs may be gathered by a few extracts from *Mercurius Rusticus; the Country's Complaint recounting the sad Excuts of this Unparraleld Warr.* 12mo. 1647†. At Westminster, we are told, "the soldiers of Westborne and Cæwoods' Companies were quartered in the Abby Church, where they brake down the rayl about the Altar, and burnt it in the place where it stood: they brake downe the Organs, and pawned the pipes at severall ale-houses for pots of ale. They put on some of the Singing-mens surplices, and in contempt of that canonicall habite, ran up and down the Church; he that wore the surplice was the hare, the rest were the hounds." At Exeter Cathedral, "they brake downe the organs, and taking two or three hundred pipes with them, in a most scornefull contemptuous manner, went up and downe the streets piping with them; and meeting with some of the Choristers of the Church, whose surplices they had stolne before, and imployed them to base servile offices, scoffingly told them, *Boyes we have spoyled your trade, you must goe and sing hot pudding pyes.*" At Peterborough Cathedral, after committing all kinds of destruction, "when their unhallowed toylings had made them out of wind, they took breath afresh on two pair of organs‡". At Canterbury, "they violated the monuments of the dead, and spoyled the

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* Two years before the passing of the Ordnance just mentioned, a tract appeared, entitled "The Organs Funerall, or the Quiristers Lamentation for the Abolishment of Superstition and Superstitious Ceremonies. In a Dialogicall Discourse between a Quirister and an Organist, An. Dom. 1642. London, Printed for George Kirby." 4to.

† Edited by Dr. Bruno Ryves, an unflinching opponent of cant and hypocrisy. At the Restoration, he was rewarded with the Deanery of Windsor. The *Mercurius Rusticus* was originally published in numbers. In its collected form, it went through many editions.

‡ Gunton is more particular in his account of the devastations here:—"The first that came was a foot regiment, under one Colonel Hubbard's command; upon whose arrival, some persons of the town, fearing what happened afterwards, desire the chief commander to take care the soldiers did no injury to the church; this he promises to do, and gave order to have the church doors all locked up. Some two days afterwards comes a regiment of horse, under Colonel Cromwell, a name as fatal to minsters as it had been to monasteries before. The next day after their arrival, early in the morning, these break open the church doors, pull down the organs, of which there were two pair. The greater pair, that stood upon a high loft over the entrance into the choir, was thence thrown down upon the ground, and there stamped and trampled on, and broke in pieces, with such a strange, furious, and frantick zeal, as cannot be well conceived, but by those that saw it."—*History of the Church of Peterborough*, p. 333." Will modern writers tell us any more, after this, that "Cromwell himself was *partial* to the organ?". The story about his protecting the organ of Magdalene College, Oxford, we shall presently show to be false.

organs*;" and at Chichester Cathedral, "they leave the destructive and spoyling part to be finished by the common soldiers; brake down the organs, and dashing the pipes with their pole-axes, scoffingly said, *Harke how the organs goe.*" At Winchester, "they entered the Church with colours flying, and drums beating: they rode up through the body of the Church and Quire, until they came to the altar, there they rudely pluck downe the table and brake the rayle, and afterwards carrying it to an ale-house, they set it on fire, and in that fire burnt the Books of Common Prayer, and all the Singing Books belonging to the Quire: they threw downe the organs, and break the Stories of the Old and New Testament, curiously cut out in carved work."

Sir William Dugdale, in his *Short View of the Late Troubles in England*, folio, 1681, says, "and when their whole (the Parliamentary) army, under the command of the Earl of Essex, came to Worcester, the first thing they there did, was the prophanation of the Cathedral; destroying the organ; breaking in pieces divers beautiful windows, &c."

The sacrilegious profanations of Norwich Cathedral is graphically described in Bishop Hall's *Hard Measure*, 1647†: "Lord, what work was here, what clattering of glasses, what beating down of walls, what tearing up of monuments, what pulling down of seats, what wresting out of irons and brass from the windows and graves, what defacing of arms, what demolishing of curious stone work, that had not any representation in the world, but only the cost of the founder, and skill of the mason; what toting and piping upon the destroyed organ pipes, and what a hideous triumph on the market day before all the country, when in a kind of sacrilegious and profane procession, all the organ pipes, vestments, both copes and surplices, together with the leaden cross, which had been newly sawn down from over the green yard pulpit, and the service books and singing books that could be had, were carried to the fire in the public market place; a lewd wretch walking before the train, in his cope, trailing in the dirt, with a service book in his hand,

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* In Culmer's *Cathedral News from Canterbury*, p. 19, we read, "The news was that the troopers fought with God Himself in the cathedral Quire at Canterbury. But the truth is that on the 26th of August. 1642, some zealous troopers, after they had (by command) taken the powder and ammunition out of the malignant Cathedral, they fought (it seems) with the Cathedral goods; namely, altars, images, service-books, prick-song-books, surplice, and organs: for they hewed the altar rails all to pieces, and threw their altar over and over and over down the three altar steps, and left it lying with the heels upward: they slashed some images, crucifixes, and pricksong-books, and one greasy service-book, and a ragged smock of the whore of Rome, called a surplice, and began to play the tune of the *Zealous Soldier* on the organs or case of whistles, which never were in tune since."

† Dr. Joseph Hall was successively Bishop of Exeter and Norwich.

imitating, in an impious scorn, the tune, and usurping the words of the Litany, used formerly in the church; near the public cross all these monuments of idolatry must be sacrificed to the fire, not without much ostentation of a zealous joy in discharging ordnance to the cost of some who professed how much they had longed to see that day. Neither was it any news, upon this Guild day, to have the Cathedral, now open on all sides, to be filled with musketeers, waiting for the major's return, drinking and tobaccoing as freely as if it had turned ale-house."

At the Nunnery, at Little Gidding, in Huntingdonshire, the same feats were carried on. We are told that "Soon after Mr. Ferrar's death, certain soldiers of the Parliament resolved to plunder the house at Gidding. The family being informed of their hasty approach, thought it prudent to fly; while these military zealots, in the rage of what they called *reformation*, ransacked both the church and the house; in doing which, they expressed a particular spite against the organ. This they broke in pieces, of which they made a large fire, and at it roasted several of Mr. Ferrar's sheep, which they had killed in his grounds. This done, they seized all the plate, furniture, and provision, which they could conveniently carry away. And in this general devastation, perished the works which Mr. Ferrar had compiled for the use of his household, consisting chiefly of harmonies of the Old and New Testament*."

Similar examples of ignorant fanaticism might readily be adduced; but the passages cited are sufficient for our purpose.

After the parliamentary ordinance of 1644, and the zeal of the Sectarians in putting their orders into force, it is somewhat remarkable that any Church organs should have escaped demolition. But that some instruments were suffered to remain, we have accredited evidence. Among the number, were those of St. Paul's, York, Durham, and Lincoln Cathedrals; St. John's and Magdalene Colleges, Oxford; Christ's College, Cambridge; and probably many others†. That the organ of St. John's escaped destruction, is the more extraordinary, as it had been erected under the patronage of Archbishop Laud, and as Cromwell's visitors had ordered Sir William Paddy's donation for founding the choral Service in that chapel to be entirely applied to the augmentation of the President's salary.

The popular account of the organ of Magdalene College is, that during the rebellion it was conveyed by order of Cromwell to Hampton Court, where

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* See Izaak Walton's *Lives of Donne, Wotton, Hooker, &c.* edit. 1845, note, p. 336.

† The author of *A Short Account of Organs built in England, &c.* makes a startling assertion at the commencement of his first chapter:—"During the Rebellion, *all* the Organs in England were destroyed by order of the Parliament, with all other Church furniture, which was considered as appertaining to the Romish ritual."

it remained in the Great Gallery till the Restoration, when it was restored to the College*.

This story, like many others of a similar kind, is probably apocryphal. From the following passage in John Evelyn's *Diary*, under the date July 12th, 1654, we learn that the organ was then in its *original* place; and the inference is that it had never been removed: "Next we walked to Magdalen College, where we saw the library and chapel, which was likewise in pontifical order, the altar only I think turned tablewise; *and there was still the double organ*, which abominations (as now esteemed) were almost universally demolished; Mr. Gibbon [Christopher Gibbons], that famous musician, giving us a taste of his skill and talents on that instrument."

The devastation committed upon organs by those misguided ruffians, the soldiers and commanders of the Parliamentary army, was not easily remedied. It was not until some time after the restoration of monarchy that these instruments could be reinstated. Pepys, that entertaining old gossip, has two or three interesting entries in his *Diary* bearing upon this point.

"July 8, 1660. (Lord's day). To White-Hall Chapel, where I got in with ease, by going before the Lord Chancellor with Mr. Kipps. Here I heard very good musique, the first time that ever I remember to have heard the *organs*, and singing-men in surplices, in my life."

"April 5, 1667. To Hackney, where good neat's tongue, and things to eat and drink, and very merry, the weather being mighty pleasant; and here I was told, that at their church they have a fair *pair of Organs*, which play while the people sing, which I am mighty glad of, wishing the like at our church at London, and would give £50 towards it."

"April 21, 1667. To Hackney Church, where very full, and found much difficulty to get pews, I offering the sexton money, and he could not help me. . . . . That which I went chiefly to see was the young ladies of the schools, whereof there is great store, very pretty; and also the *organ*, which is handsome and tunes the psalms, and plays with the people; which is mighty pretty, and makes me mighty earnest to have a pair at our church; I having almost a mind to give them a pair, if they would settle a maintenance on them for it."

"As to organs," says Burney, "the difficulty of procuring them, upon short notice, seems to have been greater than of finding either performers or music to perform. . . . . After the suppression of Cathedral Service and prohibition of the Liturgy, some of the ecclesiastical instruments had

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* This anecdote may be traced to Warton (*Observations on the Fairy Queen of Spenser*, Lond. 1762, vol. ii, p. 236), who probably received his information from his father, a Fellow of Magdalene College. Gutch, Chalmers, Hawkins, Burney, and Ingram, copy Warton.

been sold to private persons, and others but partially destroyed; these being produced, were hastily repaired and erected for present use*.

"A sufficient number of workmen for the immediate supply of cathedrals and parish churches with organs, not being found in our own country, it was thought expedient to invite foreign builders of known abilities to settle among us; and the premiums offered on this occasion brought over the two celebrated workmen, Smith and Harris."

The establishment of these two eminent men in this country, forms a new epoch in the History of Organ-building.

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* It was not until the lapse of more than half a century after the Restoration that our parish churches began commonly to be supplied with organs. In 1708, when Hatton published his *New View of London*, a very large number of our places of public worship were without them. To what an extent other English cities were deficient in this particular, may be gathered from Drake, who, at p. 338 of his *Eboracum*, published in 1733, says, "There is now only *one* parish church in the whole city of York that possesses an organ; and that came from the Popish chapel, the curators of which purchased it from Durham Cathedral."

As to English organs, prior to the Rebellion, very few are in existence. An old organ, said to be "the *first* made in England," may be seen at Ightam Moat-House, in Kent. Another old instrument, called in Mr. Brady's Catalogue "the *second* organ made in England," is preserved at Knole House, in the same county. Similar instruments may be found at Hatfield House, and at an old mansion—the reputed residence of Cardinal Wolsey—at Cheshunt.

FOURTH EPOCH.

THE FOUNDERS OF MODERN ORGAN-BUILDING.

24. *Father Smith.*

"Bernard Schmidt, as the Germans write the name, brought over with him from Germany, of which country he was a native, two nephews, Gerard and Bernard, his assistants; and to distinguish him from these, as well as to express the reverence due to his abilities, which placed him at the head of his profession, he was called Father Smith. The first organ he engaged to build for this country, was for the Royal Chapel at Whitehall, which being hastily put together, did not quite fulfil the expectations of those who were able to judge of its excellence. An organ is so operose, complicated, and comprehensive a piece of mechanism, that to render it complete in tone, touch, variety, and power, exclusive of the external beauty and majesty of its form and appearance, is perhaps one of the greatest efforts of human ingenuity and contrivance. It was probably from some such early failure, that this admirable workman determined never to engage to build an organ upon short notice, nor for such a price as would oblige him to deliver it in a state of less perfection than he wished. And I have been assured by Snetzler, and by the immediate descendants of those who have conversed with Father Smith, and seen him work, that he was so particularly careful in the choice of his wood, as never to use any that had the least knot or flaw in it; and so tender of his reputation, as never to waste his time in trying to mend a bad pipe, either of wood or metal; so that when he came to voice a pipe, if it had any radical defect, he instantly threw it away, and made another. This, in a great measure, accounts for the equality and sweetness of his stops, as well as the soundness of his pipes to this day*."

Such is the brief and unsatisfactory account of this eminent artist handed down to us by Dr. Burney. We are not told the period of his birth or decease; the particular part of Germany from whence he came; the builder or builders under whom he acquired the knowledge of his art, nor indeed any of those *minute facts* which it is the business of a faithful biographer duly to chronicle. This is the more to be regretted, because both Burney and Hawkins lived with many who could easily have supplied information, which at this period of time we look for in vain.

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* Burney's *History of Music*, vol. iii, p. 436.

In the middle of the seventeenth century, Germany and Holland possessed many organ-builders whose fame had gone forth beyond their own countries. Christian Former, of Wettin (near Halle); Schnitker, of Hamburgh; and Eugène Casperini, were foremost in the ranks; and under the able tuition of one of these builders Smith most likely learnt his art. Tradition, indeed, points out Christian Former as his master, and this seems to us more than probable*.

Father Smith was certainly in this country in the year of the restoration of King Charles the Second; and his first organ, that of the Royal Chapel at Whitehall, was built before the 8th of July, 1660. Pepys thus alludes to it, in his Diary under that date:—"(Lord's Day). To Whitehall Chapel, where I got in with ease by going before the Lord Chancellor with Mr. Kipps. Here I heard very good musique, the first time that ever I remember to have heard the organs, and singing men in surpliees, in my life."

In 1662, Smith built a new organ for Westminster Abbey; and in 1671, an instrument for the parish church of St. Giles's in the Fields. In 1675, he built an organ for St. Margaret's, Westminster; and on the 5th of April in the following year, he was elected "organist" of the same church†.

Smith was now rapidly acquiring fame, and high in the favour of the King, who appointed him his "organ-maker in ordinary," and allotted him apartments in Whitehall, called, in consequence, "The Organ-builder's Work-house‡." He had, however, to contend with a formidable rival in Renatus Harris, who arrived in this country from France shortly after Smith came from Germany.

We now turn again to the pages of Burney's History for his account of the famous contention between these two rival builders concerning the Temple organ.

"About the latter end of King Charles the Second's reign, the master of

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* There is a curious note in Warburton's *History of Dublin*, 1818, vol. i, p. 483; but the dates will not reconcile it with the subject of our memoir. Speaking of St. Patrick's Cathedral, Dublin, the writer adds, "The organ is said to have been the gift of the Duke of Ormond: it was the work of *Smith, the Father of Rotterdam*, and intended for a church in Vigo, in Spain, where, however, it never was erected: when the Duke assisted in the attack made by the combined fleets of England and Holland on the ships in the harbour of that town in 1702, it had not been landed from the vessel which conveyed it from Rotterdam, and, of course, fell into the hands of the assailants."

The Cathedral Church of St. Canice, Kilkenny, is said to contain an ancient organ from St. Vigo, in Spain, from whence it was removed by Sir Francis Drake, when he plundered that town in 1587! Both stories partake of the marvellous, and seem to point at the same blundering origin.

† By an order of August 7, in the same year, his salary was fixed at £20 a year. His predecessors in the same office were John Egglestone, John Parsons, and John Hilton. See the Rev. M. Walcott's *Memorials of Westminster*, p. 128.

‡ Ibid.

the Temple and the benchers, being determined to have as complete an organ erected in their church as possible, received proposals from both these eminent artists (i. e. Smith and Harris), backed by the recommendation of such an equal number of powerful friends and celebrated organists, that they were unable to determine among themselves which to employ. They therefore told the candidates, if each of them would erect an organ, in different parts of the church, they would retain that which, in the greatest number of excellences, should be allowed to deserve the preference. Smith and Harris agreeing to this proposal, in about eight or nine months, each had, with the utmost exertion of his abilities, an instrument ready for trial. Dr. Tudway, living at that time, the intimate acquaintance of both, says that Dr. Blow and Purcell, then in their prime, performed on Father Smith's organ, on appointed days, and displayed its excellence; and, till the other was heard, every one believed that this must be chosen.

"Harris employed M. Lully*, organist to Queen Catherine, a very eminent master, to touch his organ, which brought it into favour; and thus they continued vying with each other for near a twelvemonth.

"At length, Harris challenged Father Smith to make additional reed-stops in a given time; these were the vox-humana, Cremorne, the double Courtel, or double bassoon, and some others.

"The stops which were newly invented, or at least new to English ears, gave great delight to the crowds who attended the trials; and the imitations were so exact and pleasing on both sides that it was difficult to determine who had best succeeded. At length, the decision was left to Lord Chief Justice Jefferies, afterwards King James the Second's pliant chancellor, who was of that society, and he terminated the controversy in favour of Father Smith; so that Harris's organ was taken away without loss of reputation, having so long pleased and puzzled better judges than Jefferies†.

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* This should be Baptist Draghi, Organist to Queen Catherine, at Somerset House. See the curious anecdotes of him and M. Locke in the Hon. Roger North's *Memoirs of Music*, first printed from the original MS. by the present writer. Dr. Tudway (from whom Burney derived this account) wrote *Baptist*, which Burney interpreted to mean *Baptist* Lulli: hence the mistake, which has been repeated *ad infinitum*, by writers who ought to have known better.

† "The efforts of Smith and Harris were brought into and heard by an open court, supported by counsel, who exerted their best abilities in their defence, had a respectable variety of jurors, and Judge Jefferies gave sentence, which was in Smith's favour. In other words, the organ made by Harris was placed on one side of the church, and that of Smith on the other; the former played by Draghi, the latter by Dr. Blow and Mr. Purcell. Near a year elapsed before the contention ceased, and Jefferies made his fiat." Malcolm's *Londinum Redivivum*, vol iii, p. 106.

Jefferies' conduct seems to have been somewhat misrepresented in this affair. It has been suggested by a learned templar, that this famous contest was decided by *vote*. Jefferies happened to be "of the house," and it fell to his lot to give the *casting* one. Surely he is entitled to no obliquity on this account! Jefferies has much to answer for; but there is no evidence of "bribery and corruption" in the present case.

"The Hon. Roger North, who was in London at the time of the contention at the Temple church, says, in his Memoirs of Music, that the competition between Father Smith and Harris, the two best artists in Europe, was carried on with such violence by the friends of both sides, that they 'were just not ruined.' Indeed, old Roseingrave assured me, that the partizans for each candidate, in the fury of their zeal, proceeded to the most mischievous and unwarrantable acts of hostilities; and that in the night, preceding the last trial of the reed-stops, the friends of Harris cut the bellows of Smith's organ in such a manner, that when the time came for playing upon it, no wind could be conveyed into the wind-chest*."

Smith's next large organ was the noble instrument for Durham Cathedral, a copy of the agreement for which possesses many points of interest to the curious in such matters.

"A. D. 1683.

"Articles of agreement covenanted, concluded, and agreed upon the eighteenth day of August in the five and thirtieth year of the reign of our Sovereign Lord Charles the Second by the grace of God, King of England, Scotland, France and Ireland, Defender of the Faith. Between the Rt. Hon. John Sudbury, Doctor of Divinity, Dean, and the Chapter of Durham of the Cathedral Church of Christ and blessed Mary the Virgin, of the one part, and *Bernard Smith* of the city of London, Organ-maker, of the other part as followeth.

"Imprimis. It is agreed by and between the said parties and the said *Bernard Smith* for himself, his executors, and administrators, doth hereby covenant, promise, and agree to and with the said Dean and Chapter and their successors by these presents that he the said *Bernard Smith* for and in consideration of the severall sums of money herein after mentioned shall and will before the first day of May which will be in the year of our Lord one thousand six hundred and eighty five, at his own proper cost and charges make and fitt up in the Organ loft of the said Cathedrall Church of Durham, a good, perfect, laudable, and harmonius great Organ and Choir Organ with a case of good sound and substantiall Oak wood, according to a draught or modell of an organ in parchment whereon or whereunto all the said partys have subscribed their names at or before the time of sealing and delivering of these presents.

"Item it is agreed by and between the said partys that the said *Bernard Smith* shall make in the said great organ these seventeen stops, viz.:

"Two open diapasons of Metall containing one hundred and eight pipes.

A stop diapason of wood containing fifty four pipes.

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* Burney's *History of Music*, vol. iii, p. 437. The substance of this account is derived from a letter written by Dr. Tudway to his son, and preserved in the Harleian Collection of MSS.

A prineipall of Metall eontaining fifty four pipes.
A eornet of Metall eontaining ninety six pipes.
A quinta of Mittall eontaining fifty four pipes.
A super octave of Mitall eontaining fifty four pipes.
A Holfluit of wood eontaining fifty four pipes.
A Bloek flute of Mittall eontaining fifty four pipes.
A small quint of Mittall eontaining fifty four pipes.
A Mixture of three ranks of pipes of Mittall containing one hundred and sixty two pipes.
A trumpett of Mittall eontaining fifty four pipes.
And in the Choir organ five stops, viz.:
A prineipal of Mittall in the front eontaining fifty four pipes.
A stop diapason of wood containing fifty four pipes.
A voiee Humand of Mittall eontaining fifty four pipes.
A holfluit of wood eontaining fifty four pipes.
And a super oetave of Mittall eontaining fifty four pipes.

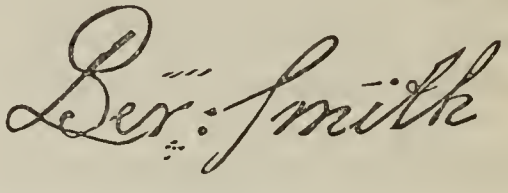
"Item it is agreed by and between these parties that the said great Organ shall have a baek front towards the body or west end of the Chureh which shall be in all things and respects like to the fore front both in pipes and earving. And all the pipes belonging to the two diapason stops shall speak at will in the said back front as in the fore.

"Item in eonsideration of which work by the said *Bernard Smith* to be done and formed in the manner and form aforesaid the said Dean and Chapter for themselves and their suecessors do eovenant and grant to and with the said *Bernard Smith* his Exeeutors and administrators by these presents in manner and form following, that is to say that the said Dean and Chapter shall and will well and truly pay or cause to be payd unto the said *Bernard Smith*, his exeeutors, administrators, or assigns the sum of seven hundred pounds of good and lawful money of England at three several payments, that is to say two hundred thirty three pounds six shillings and eightpence thereof in hand at or before the sealing and delivering hereof the reeeipt whereof the said *Bernard Smith* doth hereby aeknowledge and eonfess thereof and of every part and pareel thereof doth elearly aequit, exonorate, and diseharge the said Dean and Chapter [blank in deed] by these presents other two hundred thirty three pounds six shillings and eightpence thereof when the said whole organ or organs is or are brought into the said Cathedral Chureh and ready for fitting up, and other two hundred thirty three pounds six shillings and eightpenee being the residue thereof and in full amount of the said sum of seven hundred pounds when the whole organ is sitt up and in every respect finished aeeording to the true intent and meaning of these articles. And further that the said *Bernard Smith* shall have and take to his own use, benefit, and eharge the old organ now belonging to the said Cathedral Chureh and all the Materialls thercunto belonging. Provided the said *Bernard Smith* shall not

or do not remove, take nor carry away the said old organ till the new organ be ready for fitting up as aforesaid.

"And lastly, whereas the pipes of the two fronts of the said great organ and the front pipes of the said choir organ are to be painted and guilt according to the best way and mode of painting and guilding of organs, at the proper cost and charges of the said *Bernard Smith*. It is hereby agreed, by and between the said parties, that if the said *Bernard Smith* do well and sufficiently perform all the aforesaid works, in making, finishing, and sitting up the said new organ, to the ample satisfaction and content of the said Dean and Chapter; that the said Dean and Chapter shall pay, or cause to be payd unto the said *Bernard Smith*, his executors, administrators or assigns, the sum of fifty pounds, of good and lawfull money of England, and in full satisfaction for the painting and guilding the said organ.

"In witness whereof to the one part of these articles remaining with the said *Bernard Smith*, the said Dean and Chapter have put this Chapter seal, and to the other part remaining with the said Dean and Chapter, the said *Bernard Smith* hath put his hand and seal the day and year above written.



"Signed, sealed and delivered in the presence of
WILLIAM WILSON.
JO. SIMPSON."*

In consequence of the reputation which Father Smith had acquired by these instruments, he was made choice of to build an organ for St. Paul's Cathedral, then in the course of erection. A place was accordingly fitted up for him, in the cathedral, to do the work in, but it was a long time before he could proceed with it, owing to a contention between Sir Christopher Wren and the Dean and Chapter. Sir Christopher Wren wished the organ to be placed on one side of the choir, as it was in the old cathedral, that the whole extent and beauty of the building might be seen at one view: the

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* In the year 1691, Smith made some additions to the organ, and the following is a copy of his receipt, preserved by the Dean and Chapter:

"Received of John Rowell Twenty four pounds being the last payment and in full of Fifty Pounds given to me by the Worsh[l] The Dean and Chapter of Durham for work done at y[e] Organ.

I say rec[d]
By me
BER: SMITH."

Dean, on the contrary, wished to have it at the west-end of the choir; and Sir Christopher, after using every effort and argument to gain his point, was at last obliged to yield.

Smith, according to his instructions, began the organ; and, when the pipes were finished, found that the case was not spacious enough to contain them all: and Sir Christopher, tender of his architectural proportions, would not consent to let the case be enlarged to receive them, declaring the beauty of the building to be already spoilt by the d——d box of whistles. Three of the stops were in consequence obliged to be kept out; viz. a bassoon, a clarion, and another stop of minor consequence, which were kept in the Cathedral for several years after; Smith hoping he might get them in at some future period: but he died a few years before Sir Christopher Wren.

After all this contention, the architect, sorely against his will, was obliged to make an addition to the case. He not only had been niggardly in regard to the depth of it, where another foot would have been of no consequence whatever, but also in the height; for when Smith came to put in the large open diapason pipes in the two side flats, they appeared through the top nearly a foot in length, and spoiled the appearance entirely. Smith now entertained hopes of having a new case, but Sir Christopher, who before would not suffer any ornaments on the top, was now obliged to add several feet, or else alter the case, which vexed him exceedingly. These ornaments consist of angels with trumpets, standing at the side of a small altar. The colour of the wood, of which these are made, being lighter than the rest of the organ case, the addition is soon discoverable. The organ case (to the top of the ornaments) stands near thirty feet high; the distance from the floor of the building being about forty-six feet. It is eighteen feet wide, and eight feet deep. The carving about the case is very good; it was executed by Grinlin Gibbons, whose decorations embellish every part of the choir. The organ was opened with Divine Service, at the thanksgiving for the Peace of Ryswick, Dec. 2, 1697*; but the Cathedral was not entirely finished till 1715†.

Another famous instrument of Smith's, is the organ in the Chapel of Trinity College, Cambridge. It was built in 1708, during the Mastership of the celebrated Dr. Bentley, of whose club in London Father Smith was a member. The erection of this organ, together with the repairs of the chapel, which were carried on under the auspices of the Master, in direct opposition

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* The writer has in his library an original MS. Anthem, subscribed at the end— "This was made by Dr. Blow, Oct. ye 15, 1697, at Hamton town, for the opening of St. Paul's Cathedral.

† The above account of the Organ of St. Paul's Cathedral is copied from the first number of the *Musical Gazette*, January, 1819; a work which appears to have existed only a few months. The editor was Dr. Busby.

to the wishes of the Fellows, gave rise, amongst other things, to the serious quarrels which took place between Bentley and his College, and which nearly cost him his Mastership. Smith died before the instrument was finished, as will be seen from the following extract from a college document, quoted in Bishop Monk's *Life of Dr. Bentley*, p. 161:—"He (Smith) did not live to complete the organ of Trinity; it was finished by tuning and voicing by his son-in-law, Xtopher Schrider, according to a resolution of the Master and Seniors, May 3, 1708." Sir John Hawkins seems doubtful as to the exact time of Smith's death, but tells us "That the name of Smith occurs in the lists of the Chapel establishment, from 1703 to 1709 inclusive, as organ-maker to the Chapel, and also to Queen Anne." An entry, however, in the parish-books of St. Margaret's, Westminster, sets the matter in question at rest:—"On the 6th day of April, 1708, Henry Turner was elected Organist of St. Margaret's, Westminster, in the room of Bernard Smith, *deceased**."

It would be interesting to give an account of all the organs built by Father Smith, but this is impracticable. The following list has been drawn up with some care, and is probably as complete as it can now be made.

List of Father Smith's Organs.

1. The Royal Chapel, Whitehall. 1660.

Part of an organ by Smith still remains in the present Whitehall Chapel. Little of the original work, however, exists; as it was partly melted down in 1814, and a new inside put into the old case, by Elliot. This organ is said to have been the instrument built by Smith immediately after his arrival in this country; but this can hardly be the fact, as that organ must have been burnt in the great fire which consumed so many of the ancient buildings of Whitehall, in 1697.

Paterson, in his *Pietas Londinensis*, 1714, p. 282, says:—"Whitehall was unfortunately laid in ashes by that dismal fire in Jan. 4, 1697; at which time the Royal Chapel was also consumed; wherefore his late majesty erected a new one, in that most spacious and beautiful room called the Banqueting House, built by King James I; and so it continues the Royal Chapel, for the use of the nobility, gentry, and other inhabitants thereabout."

2. Westminster Abbey. 1662.

This was the organ on which Blow, Purcell, and Croft played. It appears, by the treasurer's books of the Abbey, to have cost £120.

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* A memoir of Smith, chiefly extracted from Hawkins, may be seen in Noble's *Continuation of Granger's Biographical History of England*, vol. ii, p. 362; and a more elaborate notice in Mr. Sutton's *Short Account of Organs in England, &c.* p. 17. An excellent painting of Father Smith still adorns the walls of the disused Music-school, Oxford, which has been wretchedly copied in Hawkins's *History*.

3. St. Giles's in the Fields. 1671.

The original cost of this organ is not given in the Parish Books. In Parton's *History of the Parish of St. Giles's*, p. 287, is this entry:—"1698. The sum of £166 14s. 1d. was collected towards repairing the organ; and the celebrated Smith, who had built it, offering completely to set it to rights for £200, was employed, and finished the same this year."

Again, in the following year, is this notice: "1699. Paid £200 to Mr. Christian Smith (the builder's nephew), for making and setting up the organ in the church."

This instrument is the one still in use.

4. St. Margaret's, Westminster. 1675.

Malcolm, in his *Londinum Redivivum*, vol. iv, p. 165, has preserved the following entry respecting this organ:—"1675. Item, to Mr. Bernhard Smith, for the charge of the organ newly erected in the parish church, £200."

Sir John Hawkins, in his *History of Music*, vol. iv, p. 510, speaking of the children of the celebrated Henry Purcell, says; "Of these children we have been only able to trace one, viz. a son, named Edward, who was bred up to music, and, in July, 1726, was elected Organist of St. Margaret's, Westminster. Upon inspection of the parish books, for the purpose of ascertaining this fact, it appears the organ of this church was built by Father Smith in 1676, and that he himself was first organist there, and played for a salary." The learned historian is in error *one* year as to the date of the erection of this organ. Smith was appointed organist, April 5, 1676; but the instrument, as we see from Malcolm, was built in 1675. Smith's organ was removed in 1804, and a new one supplied by Avery.

5. Christ Church Cathedral, Oxford. 1680.

6. St. Peter's, Cornhill, 1681.

This organ originally cost £210, inclusive of "painting and gilding,"

Paterson (*Pietas Londinensis*, p. 231), speaking of this church, adds: "Within it's beautified with a stately new organ, maintain'd by the gift of Mr. Benjamin Thorowgood, in 1682."

7. St. Mary, Woolnoth. 1681.

Hatton, in his *New View of London*, 1708, vol. ii, p. 411, says; "The organ case is enriched with three large figures of Fame; and on the front are, in gold letters, some texts of Scripture, relating to praising God with Church Musick." The date above given is also on the exterior of the case.

8. The Temple Church. 1682.

The date usually assigned to this noble instrument is 1687; but it is manifestly incorrect, as contemporary authorities tell us that it was erected in the reign of Charles II, who ceased his career in 1685. The true date is undoubtedly that above assigned; when Hatton tells us, "The Temple Church having narrowly escaped the flames in 1666, it was in 1682 beautified, and the curious wainscot screen set up."

The swell-organ was added by Byfield at a subsequent period.

9. Durham Cathedral. 1683.

Smith received £700, and the materials of the old organ, for this noble instrument. (See ante, p. 78.) It was repaired in 1748, by Abraham Jordan, who probably added the swell.

10. St. Mary-at-Hill, Billingsgate. 1693.

Hatton, in his *New View of London*, 1708, vol. ii, p. 376, says: "And here is a pretty organ, composed of these stops, and set up *anno* 1692-3." Then follows the following curious list of stops: "A stop-diapason of wood. A recorder of wood. A fifteenth of metal. A mixture of 3 ranks of metal. A vox-humane. A trimeloe. A principal of metal. A cornet of 5 ranks, all of metal advanced exactly. A tierce of metal. A trumpet of metal throughout. An echo to the whole. To draw all in whole stops, except the great 12th, the 15th, the tierce, the mixture, the vox-humane, and the trumpet; all which are broken, and made to draw in half stops, for the benefit of increasing the variety in the organ." This organ has long been removed.

11. St. Paul's Cathedral. 1697.

"Bernhard Smith entered into a contract with the commissioners, Dec. 19, 1694, to erect the great organ and a chair organ, for £2000." Malcolm's *Londinum Redivivum*, vol. iii, p. 105.

The organ was opened Dec. 2, 1697; but the cathedral was not entirely finished till 1715.

12. St. Mary's (University Church), Cambridge. 1697.

13. Ripon Cathedral.

14. St. David's Cathedral.

The case and the diapason-pipes alone remain.

15. St. Mary's (University Church), Oxford.

16. The Theatre, Oxford.

This organ was taken down by Byfield about a century ago, and placed in the Church of St. Peter in the East, Oxford.

17. St. George's Chapel, Windsor.

This organ remained in the Royal Chapel until 1788; when the king, upon the completion of the new organ, by Green, presented it to Old Windsor Church. It is now in the New Church at Haggerstone, Middlesex.

18. The Chapel of Eton College.

19. Southwell Collegiate Church.

Repaired and completed by Snetzler in 1766.

20. Hampton Court Palace Chapel.

This organ is in a recess on the south-side of the choir; the case is richly carved by Gibbons.

21. Manchester Cathedral.

The choir organ only; it still remains in its original state.

22. St. James's, Garlick Hill.

23. St. Clement Danes.

24. St. Dunstan's, Tower Street.

This organ is now in St. Alban's Abbey.

25. High Church, Hull, Yorkshire.

Traditionally said to have been intended for St. Paul's Cathedral, in addition to the present instrument.

26. All Saints, Derby.

27. St. Margaret's, Leicester.

This organ has been rebuilt.

28. West Walton Church, Norfolk.

The case only remains.

29. All Saints, Isleworth, Middlesex.

Much improved by Green in 1776.

30. Pembroke College Chapel, Cambridge.

31. Emanuel College, ditto.

32. Christ's College, ditto.

The three last-named organs remain in nearly their original state; they have been disused for more than half a century. We have assigned them to Father Smith, upon the authority of Sir W. Cope, Bart.

33. St. Catherine Cree, Leadenhall Street.

34. Worcester Cathedral.

In Valentine Green's *Survey of the City of Worcester*, 8vo. 1764, p. 54, is the fol lowing notice of a former organ:—"The organ of this church, which, with its gallery, terminates the west-end of the choir, is esteemed a fine instrument, consisting of nine stops: The trumpet stop is justly allowed to be the finest of that sort in the kingdom. The last reparation of it cost three hundred pounds, which sum was raised by a voluntary contribution of several noblemen and gentlemen, whose arms are emblazoned on the west-front of its gallery. * * * The east-front of this gallery, towards the choir, has a pretty deception of marble, well imitated; and presents a view of the lesser or *choir* organ, which has communication with the great one, and consists of five stops."

35. Chester Cathedral.

This organ was removed in 1844. A small organ, probably by the same maker (formerly used to accompany the choir), is still preserved in an apartment in the cloisters.

36. Hereford Cathedral.

37. St. Olave's, Southwark.

38. Trinity College Chapel, Cambridge. 1708.

25. *Renatus Harris.*

According to Dr. Burney, "Smith had not been many months here, before Harris arrived from France, with his Son René or Renatus, an ingenious and active young man, to whom he had confided all the secrets of his art. However, they met with but little encouragement at first, as Dallans and Smith had the chief business of the kingdom; but upon the decease of

Dallans, who died while he was building an organ for the old church at Greenwich, 1672, and of the elder Harris, who did not long survive him, the younger became a formidable rival to Smith*."

If the Harrises arrived in this country a few months after Father Smith, they were some time making way in their profession; for we have no record of their having built any organs before the year 1670. In this year they constructed the fine instrument for St. Sepulchre's Church, Newgate Street; and an organ for the Cathedral of Gloucester. These two organs seem to be the only ones in this country in which the elder Harris had any share, as his death is recorded to have taken place in 1672.

After this period, the younger Harris seems to have been much employed, and to have been Smith's rival upon all occasions. The memorable "battle of the organs," at the Temple Church, has already been detailed; and not long afterwards (upon the accession of James the Second), we find Harris rivalling his opponent in court patronage. The evidence of this is contained in the following curious entries, extracted from *Moneys received and paid for Secret Services of Charles II and James II,* lately printed for the Camden Society†. The dates range between 1686 and 1688.

"To René Harris, by advances for an organ to be provided for the chappell in Whitehall—£300."

"To René Harris, by advance, the same being intended to be employed in the making and buying a new organ for the chappell in Whitehall—£200."

"To René Harris, for fitting and repairing an organ for the chappell in Whitehall, and for altering and preparing an organ for the chappell at Windsor, and removing that organ from Winchester thither—£137 : 13."

"To René Harris, in full payment for making and finishing the organ in y^e^ chappell at Whitehall—£600."

Harris built a noble instrument for the Cathedral at Salisbury; the only record of which seems to be an engraving fortunately extant. This curious print measures thirty-three inches by sixteen, and purports to be "The East Front of the New Organ in Salisbury Cathedral, made in the year 1710, by Mr. Renatus Harris, Organ-Builder." "John Lyons, delin." "Francis Dewing, sculp." Running along the top of the engraving is this line:— "Vitalianus, the 74th Bishop of Rome, about the year 662, ordained organs first to be used in the Church. He was born in Segni, a city of great antiquity, on y^e^ top of a Mountain in Italy; in this city organs were first invented, or first brought to perfection." And on each side of the engraving (at the top of the print), is the following very curious description: "This Instrument, consisting of four sets of keys, and fifty stops, stands over the choir door, and is above 40 foot high and 20 foot broad; the arch under which

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* *History of Music*, vol. iii, p. 437.

† Edited by J. Y. Akerman, from a MS. in the possession of W. L. Lowndes, Esq. The entries occur, pp. 144, 169, 180, 196.

it stands, being lofty and but narrow, would admit no larger extention in breadth; and yet it was judged necessary to carry the finishing very high, to render this figure more lively and proportionable to the structure of the church (which is, from the pavement to the vaulting thereof, 80 foot high). The organ blower, as well as the bellows which are very large, have room in the body of y^e^ case, in which are all y^e^ movements, keys, rollar-boards, and eleven stops of Echos, and yet the sight of the work is conceal'd from him, as he is from the people in the Church or Gallery. This organ is a new contrivance, and on it may be more varietys express'd, than by all y^e^ organs in England, were their several excellencies united. The figures designed for the finishings of the choir organ are not as yet set up, neither are y^e^ finishings of y^e^ great organ fore shortned in this print according to perspective, because all parts of the Instruments should answer the Scale*."

It seems as if Harris had been a candidate for building the organ of St. Paul's Cathedral, as well as that at the Temple; for, in the *Spectator* (No. 552, for Dec. 3, 1712), a proposal of Mr. Renatus Harris is recommended in the following words: "The ambition of this artificer is to erect an organ in St. Paul's Cathedral, over the west door, at the entrance into the body of the church, which in art and magnificence shall transcend any work of that kind ever before invented. The proposal in perspicuous language sets forth the honour and advantage such a performance would be to the British name, as well as that it would apply the power of sounds in a manner more amazingly forcible, than perhaps has yet been known, and I am sure to an end much more worthy. Had the vast sums which have been laid out upon operas without skill or conduct, and to no other purpose but to suspend or vitiate our understandings, been disposed this way; we should now perhaps have an engine so formed, as to strike the minds of half a people at once, in a place of worship, with a forgetfulness of present care and calamity, and a hope of endless rapture, joy, and Hallelujah hereafter."

"In the latter part of his life," says Sir John Hawkins, "Renatus Harris retired to Bristol, and following his business there, made sundry organs for the churches in that city, and in the adjacent parishes, as also for churches in the neighbouring counties. He had a son named John, bred up under him, who followed the business of organ-making, and made a great number of very fine instruments†."

Renatus Harris died in or about the year 1715; and his latest organ seems to have been that in St. Mary's Church, Whitechapel.

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* A copy of this rare engraving, which seems to have been unknown to Gough and Upcott, is in the possession of the writer.

† *Hist. of Music*, vol. iv, p. 356. Sir John adds, "In the *Mercurius Musicus* for September and October, 1700, is a song inscribed: "Set by René Harris." Father Smith and Renatus Harris, following the example of their predecessors, united a knowledge of the science of music with the more mechanical art of organ-building.

List of Renatus Harris's Organs.

1. St. Sepulchre's, Newgate Street. 1670.

Two dates are assigned to this organ, 1667 and 1677; but a document in the author's possession gives it (probably correctly) as above. The date 1667 is evidently wrong, as the following extract from Hatton's *New View of London*, 1708, vol. ii, p. 546, will testify; "St. Sepulchre's being almost demolished (except part of the wall and steeple) by the fury of the devouring flames in 1666, it was again re-erected and finished, *anno* 1670.

2. Gloucester Cathedral. 1670.

This and the previous organ were built by Renatus Harris in conjunction with his father.

3. St. Botolph, Aldgate. 1676.

Upon the front of the organ is this inscription: "This Organ is y^e^ gift of Thomas Whiting to the hole [sic] parish, 1676.

St. Dunstan's, Stepney. 1676.

The case of this organ is beautifully carved in oak; and the instrument is said to be a very fine one.

4. St. Nicholas, Newcastle-upon-Tyne. 1676.

A trumpet stop was added in 1699, and in 1710 the instrument was thoroughly repaired. Snetzler added the swell in 1749.

5. Chichester Cathedral. 1678.

A trumpet stop was added by Byfield in 1725; a choir organ some twenty years later; and a swell in 1778.

6. St. Giles's, Cripplegate. 1680.

In Malcolm's *Londinum Redivivum*, vol. iii, p. 274, is the following curious extract from the parish books: "1672. Mrs. Charnock shall have thanks given her, for her affection in bestowing a faire organ upon the parish church of St. Giles: and that some convenient place shall be found for setting it up." The double duty of organist and sexton was performed by James Brookes, who was "chosen by the King's Majesties letter." It was provided, that if he did not, or could not play, he should find an organist.

In 1726, a proposal was made (and accepted) by Abraham Jordan, organist, to take the organ to pieces, the builder having left it in a very imperfect state, and repair it *gratis*, on condition of having his salary secured to him for 21 years.—See Malcolm, Ibid. p. 279.

7. Allhallows, Barking, Middlesex. 1680.

This church escaped the flames of 1666. Hatton, speaking of the organ, says, "There is likewise a handsome organ case enrich'd with Fames, and the figures (about 6 foot high) of Time and Death, carved in *basso relievo* and painted." Vol. 1, p. 98.

8. Lambeth Old Church. 1680.

9. Winchester Cathedral. 1681.

Subsequently rebuilt by Avery in 1794.

10. Winchester College Chapel. 1681.

Rebuilt by Green, in 1780.

11. St. Michael's, Cornhill. 1684.

12. Bristol Cathedral. 1685.

In the years 1681 and 1685, in the Deaneries of Towgood and Levett, £300 or more was laid out in mending the floor and beautifying the church, painting the east-end of the choir and other works, and in making a fine timber case for the new organ, erected by the contribution of the Dean and Chapter and many other well-disposed persons, at the expense of £550 in the whole, to Mr. Renatus Harris, organ-builder.—Barrett's *History of Bristol*, p. 290.

13. St. Lawrence, Jewry. 1687.

Paterson, in his *Pietas Londinensis*, 1714, p. 131, calls it "a fine organ;" an opinion in which the writer concurs. The case, with its choir organ in front, is one of the finest specimens of its kind in London.

14. St. James's, Piccadilly. 1687.

This organ was made for James II, and designed for his Popish chapel at Whitehall. His daughter, Queen Mary, presented it to the church. On the front was this inscription: "The Gift of the Queen, in the year 1691." Some valuable entries respecting it have already been given (see *ante*, p. 86).

Ambrose Warren, in his curious tract, entitled *The Tonometer*, 1727, p. 8, tells us, "About the year 1707, when Father Smith, the organ-builder, died, I was by the honourable vestry of St. James's parish chosen to keep their organ in tune and order in his stead, which I found to be in a very mean condition in many respects. And, in 1708, I was by the same authorities ordered to reform divers stops, and put in several new ones, which I with help performed, to the full satisfaction of all concerned, as well as myself."

15. St. Mary's, Ipswich. 1690.

16. Christ Church, Newgate Street. 1690.

17. St. Ann's, Westminster. 1691.

Hatton says, "Here is a fine organ, made by Mr. Harris" (p. 132); Paterson adds, "given by King William III" (p. 27). It was formerly in one of the royal apartments at Whitehall, and was presented to the church by the King in 1691. It is now in the church of St. Michael, Paternoster Royal.

18. Allhallows, Lombard Street. 1695.

This church was opened in 1695, which is the probable date of the organ. Paterson (*Pietas Londinensis*, p. 11) speaks of its "fine altar-piece and pulpit, and stately organ, made by Mr. Harris, by the contributions of forty-two benefactors." Hatton says, "the names of the benefactors to the organ" are inscribed in gold letters on the gallery."—*New View of London*, vol. i, p. 109.

19. St. Andrew's, Undershaft. 1696.

Paterson (*Pietas Londinensis*, p. 22) calls it "a most excellent and costly organ made by Mr. Harris." Hatton (*New View of London*, p. 124) calls it "a fine *large* organ," and adds, "several gentlemen (whose names I am not allowed to mention) contributed for the organ, &c. the sum of £1400."

This organ was opened on the 31st of May, 1696, when Dr. Towerson preached a sermon on Vocal and Instrumental Music in the church.

20. St. Patrick's Cathedral, Dublin. 1697.

The following extracts are from the old chapter book:—"12th August, 1695. The Dean and Chapter agrees with Renatus Harris, of London, organ-builder, to make and set

up a Double Organ for the sum of £505. In the great organ—Open Diapason of metal, Stop Diapason of wood, Principal of metal, Nason of wood, a great 12th of metal, 15th of metal, a Cornet of metal. In the little organ—a Principal of metal, Stop Diapason of wood, 15th of metal, Nason of wood, being in all 13 stops, consisting of 800 pipes, sound-board, &c. &c. The pipes of the old organ to be removed, and to allow £65 for the same."

"11th March, 1697. Organ erected and examined by the several Vicars."

"10th May, 1697. Further contract for additional stops for £350, to be paid at Strongbow's Tomb, in Christ Church, on stated times named—viz. Trumpet stop, Echo stop, *Time* stop [*sic*] entire, Open Diapason, Flute of metal, Great Furniture of 3 ranks."

21. St. Andrew's, Holborn. 1699.

Harris's organ, after its rejection at the Temple, was part of it erected at St. Andrew's, Holborn, and part in the Cathedral of Christ Church, Dublin. Sir John Hawkins records the following anecdote in his *History of Music*, vol. iv, p. 539:—"Dr. Sacheverell, having been presented to the living of St. Andrew's, Holborn, found an organ in the church, of Harris's building, which having never been paid for, had from its erection in 1699 been shut up. The Doctor, upon his coming to the living, by a collection from his parishioners, raised money enough to pay for it."

22. St. Bridget, *alias* St. Bride's, Fleet Street.

Hatton, in his *New View of London*, vol. i, p. 175, says:—"Here is a very fine organ, and a curious carved case adorned with two large Fames, &c. This organ was made by Mr. Harris."

23. Ely Cathedral, Cambridgeshire.

24. Jesus College Chapel, Cambridge.

This instrument is now in All Saints' Church, Cambridge.

25. Wolverhampton Collegiate Church.

This organ, with that of St Andrew's, Holborn, was constructed out of the rejected Temple organ. Burney says, "That part of the organ for the Temple church by Harris, and sent to Dublin, was sold after the death of the elder Byfield, to Wolverhampton for £500. It still stands in the church of that town, and is thought a very good instrument."

26. St. Clement's, Eastcheap. 1709.

"A pretty organ, made by Mr. Harris."—*Hatton*, vol. i, p. 208. This instrument was probably built in 1709, when the church "was repaired and beautified."

27. Norwich Cathedral.

This organ is attributed to Harris. Sir Thomas Browne, in his *Repertorium, or the Antiquities of Norwich*, thus alludes to the earlier Cathedral organs:—"There was formerly a fair and large, but plain, organ in the church, and in the same place with this at present. It was agreed in a Chapter by the Dean and Prebends, that a new organ be made, and timber fitted to make a loft for it, June 6, *Anno* 1607, repaired 1626, and £10 which Abel Colls gave to the church, was bestowed upon it. That, in the late tumultuous time, was pulled down, broken, sold, and made away. But since his Majesty's restoration, another, a fair, well-tuned, plain organ was set up by Dean Crofts and the Chapter, and afterwards painted and beautifully adorned, by the care and cost of my honoured friend, Dr. Herbert Astley, the present worthy Dean."—*Posthumous Works of the Learned Sir Thomas Browne*, 8vo. 1712, p. 31.

28. Salisbury Cathedral. 1710.

See the account of a curious engraving of this organ, *ante*, p. 86. This noble instrument was probably removed in 1792, when Green erected the present organ.

29. St. Mary's, Whitechapel. 1715.

This organ was opened on the 29th of May, 1715. See the *Parish Clerks Remarks on London*, 1732, p. 246.

26. *Father Smith's Nephews.*

Upon Father Smith's arrival in this country, he was accompanied (according to Hawkins, and after him Burney) by his two nephews, Bernard and Gerard. There is reason to believe that the historian was in error as to the name of the first nephew. Horace Walpole, in his corrected copy of Hawkins's *History*, altered the name of Bernard to *Christian*, and evidently upon some good authority, as we find, in the case of the repair of the organ of St. Giles' in the Fields (before quoted), *Christian* Smith received payment, and signed the receipt for the same.

No organs of this maker are known to exist.

Gerard Smith is so little known, that his name has hitherto not been registered amongst our organ-builders. Nevertheless, he built several fine instruments.

In Chamberlayne's *Magnæ Britanniæ Notitia* for 1755, we find among the officers of Chelsea Hospital, "Organ Repairer, Mr. Gerard Smith." This person was probably Father Smith's grand-nephew. The date almost precludes the possibility of his being his nephew.

Organs built by Gerard Smith.

1. Parish Church, Bedford. 1715.

This instrument was sold by the parish, when the church was restored in 1832, for £50—about the price of its case. It is now in the Moravian Chapel at Bedford.

2. All Hallows, Bread Street. 1717.

An echo was added to this organ, by the original builder, in 1722; the whole cost being £422.

3. Finedon Church, Northamptonshire. 1717.

This organ was built at the cost of Dr. Dolben, of Finedon, a great patron of music and musicians. In *A Collection of Anthems, as the same are now Perform'd in the Cathedral Church, Durham*, Durham, 8vo. 1749, p. 159, is one beginning, "Praise God in his sanctuary," "Compos'd for and Perform'd at the Opening a new Organ at Finedon, in Northamptonshire, May 17, 1717," by Dr. Croft.

The instrument is in its original state: the pipes are diapered.

4. Little Stanmore Church, near Edgware. 1720.

This church was opened on the 29th of August, 1720, for which occasion, it is probable, Handel composed his sacred drama of Esther. Whilst the Duke of Chandos resided at Cannons, the church service was performed here with all the aid of the first vocal and instrumental music. Handel, who resided at Cannons as chapel-master, composed his anthems for the use of this choir. This organ is sometimes attributed to Jordan.

5. St. George's, Hanover Square. 1725.

"This organ was erected, in 1725, by Smith, nephew to the great artist of that name; and the choice of an organist is thus mentioned in the St. James's Evening Post of Nov. 16; 'On Friday last came on the election of an organist of St. George's, Hanover Square; and the salary being settled at £45 *per annum*, there were seven candidates: Mr. Rosengrave: Mr. Cole, organist of the chapel of the Royal Hospital of Chelsea, and of St. Mary Hill, London; Mr. Monro, organist of St. Peter's, Cornhill; Mr. Stanley, the ingenious blind youth, aged 13 years and a half, organist of Allhallows, Bread-street; Mr. Centlivre, organist of Oxford Chapel, near Oxford Square; Mrs. Sweet, organist of the Chapel in Duke-street, Westminster; and Mr. Obbel, organist of St. Bartholomew the Great, in West Smithfield. The vestry, which consists of above 30 lords and 70 gentlemen, having appointed Dr. Crofts, Dr. Pepusch, Mr. Bononcini, and Mr. Geminiani, to be judges which of the candidates performed best; each of them composed a subject, to be carried on by the said candidates in the way of fuguing; and one hour was allowed for every one to play upon the four subjects so appointed, one not to hear another unless himself had done before; only the four first performed, and all of them very masterly. In the conclusion the judges gave it for the famous Mr. Rosengrave, who made that way of performance his study great part of his life; and he was accordingly chosen.'"—Malcolm's *Londinum Redivivum*, vol. iv, p. 234.

This organ is often erroneously attributed to Snetzler.

27. *John Harris and John Byfield.*

John Harris, the son of Renatus, seems to have been overlooked by all who have written upon the subject of our early organ-builders since the time of Sir John Hawkins. Indeed so little attention has been paid to dates, that we are told, "Harris's most celebrated organs are those of St. Sepulchre's, London, which, however, is now much changed since its first erection in 1667; and Doncaster, Yorkshire, 1738*." (!)

John Harris had a brother, named after his father, Renatus, the only notice of whom occurs on the fly leaf of an old MS. Collection of Voluntaries for the Organ; i. e. "John Harris, given me by my brother Renatus, A. D. 1712†."

In 1738, March 19, articles of agreement were entered into "Between John Harris, of Red Lion-street, in the Parish of St. Andrew, Holborn, in the County of Middlesex, organ maker of the one part, and the Reverend Hollis Piggot, Vicar of the Parish of Doncaster, in the County of York, William Seaton, John Hancock, James Buckley Wilford, and John Gibbons, Churchwardens of the said Parish of Doncaster, of the other part." Harris undertakes for the sum of Five Hundred and Twenty-five pounds, "to make, compleat, finish and erect," on or before the 24th day of June 1740, "a Good, Tuneful, and compleat Organ with One Handsome Front and a Case according to the Modell or Draught." "The said Organ to contain the severall stops and other particulars hereinafter mentioned, without any com-

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* *A short Account of Organs built in England*, &c. p. 60.

† In the possession of Mr. Smee, Jun. of the Bank of England.

munication or any Sett of Pipes made to serve in a double capacity in or upon both Organs (that is to say) The Great Organ to contain Twelve Stops (to wit) One open Diapason of Mettal in the front, with fifty-two speaking pipes. One open Diapason in the inside, with fifty-two Pipes. One Stop'd Diapason with fifty-two Pipes. One Principall of Mettal with fifty-two Pipes. One Twelfth of the like. One Fifteenth of the like. One Tierce of the like. One Sesquialtra of five rows of Pipes. One Cornet of five rows of Pipes. Two Trumpets with One Hundred and four Pipes. And One Clarion with Fifty-two Pipes. The Choir or Quoir Organ, to contain One Stop'd Diapason with Fifty-two Pipes. One Flute with Fifty-two Pipes. One Fifteenth with Fifty-two Pipes. And one Bassoon with Fifty-two speaking Pipes. The Eccho Organ to contain the following Stops, which shall Eccho and Swell to express passion in degrees of Loudness and Softness as if inspired by human breath (viz.) One open Diapason with twenty-seven Speaking pipes. One stop'd Diapason with twenty-seven pipes. One Principall with twenty-seven pipes. One Cornet of three Rows with Eighty-one pipes. One Trumpet and One Hautboy with twenty-seven speaking pipes to each. For the Great and Choir Organ, fifty-two pipes in each Sett, being from G G to D la sol. The Keys of the Ecchos and Swelling from C sol fa ut Cliff, to D la sol, in all being twenty-seven keys, and the Speaking Pipes in the whole Organ to be in number one thousand three hundred and thirty-nine, and the front to be gilt with Leaf Gold*."

John Harris was probably in partnership with John Byfield; at any rate, he built most of his organs in conjunction with the latter. The connection between the two builders was still closer, by Byfield's marriage with Harris's daughter. They resided at Red Lion Street, Holborn, and were living there when they built the Doncaster organ.

According to a power of attorney, dated September 16, 1740, signed John Harris, and sent from London; "John Byfield, organ-builder, of the Parish of St. George the Martyr, but now at Doncaster," is empowered to receive the money due to Harris; and on the 2nd of October in the same year, Byfield signs a receipt for Five Hundred and twenty-five pounds, "by order and for y^{e} use of Mr. John Harris."

Organs built by Harris and Byfield.

1. St. Bartholomew the Great, Smithfield. 1720.
2. St. Alban's, Wood Street. 1728.

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* Communicated by Mr. W. Sheardown, the well-known bookseller of Doncaster, to the Doncaster Chronicle, some few years back.

3. St. Mary Redcliffe, Bristol.

"The entrance into the church is at the great west door to which you ascend by steps. The door is 8 feet in breadth and 12 high, within which is built a great stone gallery, on which is a grand magnificent organ, being in all 53 feet high from the ground to the top of the crown pannel; the great case about 20 feet square, contains one great and lesser organ; the musical part executed by Messrs. Harris and Byfield, and the whole cost £846 : 7s." Barrett's *History of Bristol*, 1789, p. 574.

4. St. Mary's, Shrewsbury. 1729.

There was an organ in this church in the 16th century; and on the 31st of August 1589, it was agreed at a parish meeting that—"the organs should be sould to any of the parishe for the sum of £4, if any desired the same; otherwise the said organs should presentlye be sould to him whosoever would give £4 or more for the same." In 1590, it appears that the Dean of Worcester, "at the motion of Mr. John Tomkins, gave that sum for them, and an additional present to the churchwardens of a communion booke worthe 7s. 4d."

5. St. Thomas's, Bristol.

6. St. James's, Bristol.

This and the previous organ are assigned to Harris and Byfield, upon the authority of Rob. Broderip of Bristol.—See the Preface to his *Organists' Journal*, 1802.

7. Parish Church, Doncaster. 1739.

The agreement for this organ (before cited at length) is dated March 19, 1738. The money for the organ was raised by subscription, and the Corporation agreed to pay £20 per annum for a salary, "when and so soon as a good and complete organ shall be set up."

The celebrated Snetzler was employed upon the instrument in 1758, as appears by the following receipt—"April 26, 1756. Received of Mr. Francis Caley, church-warden, the sum of Twenty pounds for Repairing and Tuneing the Organ, by me, John Snetzler."

8. St. Thomas Southover, Lewes, Sussex.

Traditionally said to have been made for the Duke of Chandos, and removed here from Cannons in 1749.

28. *Christopher Schrider.*

Schrider, or Schreider, a German, was a workman in the employ of Father Smith, and, previous to the year 1708, had attained a closer connection, by becoming his son-in-law*. After the death of Smith, he succeeded to his

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* He probably married again, as we find the following entry in an old register of burials in the library of St. Peter's, Westminster:—"Mrs. Hellen Shrider died March 21, 1752, aged 65 years, and was buried y^e^ 27, in the South Cloyster, on her father, Mr. Thos. Jennings." Jennings was a Gentleman of the Chapel Royal, and of the Choir at Westminster. Many notices of Schrider's family occur in the same volume. The present entry may refer to the wife of Christopher Schrider, jun.

business; and, in the year 1710, to the appointment of Organ-builder to the Royal Chapels. His organs, as far as we know, are not very numerous, that of Westminster Abbey being his *chef-d'œuvre*.

The date of his death is not recorded, but it probably took place in 1754; as, in the following year, among the "Servants in Ordinary to the King," in Chamberlayne's *Magnæ Britanniæ Notitia*, we find "Organ Maker, Mr. Christopher Shrider, son of the *late* Mr. Schrider."

The following *quibbling* epitaph, upon the subject of our notice, appeared in Webb's *Collection of Epitaphs*, 1775 (vol. ii, p. 76):

ON THE CELEBRATED MR. CHRISTOPHER SHRIDER.

"Here rests the musical *Kit Shrider*,
Who organs built when he did bide here:
With nicest ear he tun'd 'em up;
But Death has put the cruel Stop:
Tho' Breath to others he convey'd,
Breathless, alas! himself is lay'd.
May he, who us such Keys has giv'n,
Meet with St. Peter's Keys of Heav'n!
His Cornet, Twelfth, and Diapason,
Could not with Air supply his Weasand:
Bass, Tenor, Treble, Unison,
The loss of tuneful Kit bemoan."

Organs built by Christopher Schrider.

1. The Chapel Royal, St James's. 1710.

This organ was removed in 1819, and, after undergoing the necessary repairs, was purchased for the Episcopal Chapel in Long Acre, for £200, where it now remains.

2. St. Mary Abbot's, Kensington. 1716.

Faulkner, in his *History of Kensington*, says: this instrument was built by subscription at a cost of £500, in the above-named year.

John Harris appears to have added the swell in 1730.

3. St. Martin's in the Fields. 1726.

This organ was the present of George the First, as the following note from Dr. Burney shows: "Schreider, who built the Organ of St. Martin's in the Fields, which King George the First presented to the Church upon being chosen churchwarden of the parish, soon after his Majesty's arrival in England."

Malcolm, writing in 1807, says: "The instrument has however been worn out and replaced." *Londinum Redivivum*, vol. iv, p. 195.

Schrider's organ is now in a church at Wotton-under-Edge, and is said not to be *worn out*.

4. Westminster Abbey. 1730.

The following memorandum occurs in a MS. book in the custody of the Precentor of Westminster: "The new organ built by Mr. Schrider and Mr. Jordan, was opened on the 1st August, 1730, by Mr. Robinson; the Anthem, Purcell's *O give thanks*."

From the treasurer's accounts, we learn that the cost of the instrument was £1000. Jordan's share in building this noble organ is not defined; but it was, in all probability, the *swell*, of which, as we shall presently show, he was the inventor.

29. *Thomas Schwarbrook.*

This eminent artist, who was also a German, was in the employ of Renatus Harris. Early in the eighteenth century, he seems to have left the metropolis, and taken up his quarters at Warwick, at which place he probably lived until his death, about the year 1750. He built many noble instruments; but his masterpiece is said to be the organ of St. Michael's, Coventry. Henry Schwarbrook was Organist of Hereford Cathedral in 1730; but it is not known if he was any relation.

Organs built by Thomas Schwarbrook.

1. St. Saviour's, Southwark. 1703.

This organ is commonly ascribed to Schwarbrook. If so, it must be one of his *earliest* instruments.

Hatton, in his *New View of London*, 1708, vol. ii, p. 538, says: "The organ-case is also of oak, very lofty, elevated on 10 square pillars, the upper part whereof is adorned with 3 Fames, carved, standing in full proportion about 42 feet from the area of the isle."

2. St Chad's, Shrewsbury. 1716.

At the west-end of the Church of St. Chad, Shrewsbury, in a gallery, supported on Corinthian pilasters, was a large and remarkably handsome organ, in a case profusely adorned with carving. On the summit stood a figure of St. Chad, in his episcopal vestments. This noble instrument is said to have cost £1500, raised by subscription, towards which £100 was contributed by the Drapers' Company. It was made by Thomas Swarebrick, a German artist of considerable eminence in his day, and erected in 1716. There is a tradition that the small organ in the Collegiate Church of Wolverhampton once belonged to St. Chad's, and preceded this.

This organ was removed in 1794.

3. Trinity Church, Coventry. 1732.

This instrument cost £600, and the old organ.

4. St. Michael's, Coventry. 1733.

This noble instrument (Schwarbrook's masterpiece), cost £1400.

It originally contained three remarkable stops—the *harp*, *lute*, and *dulcimer;* but. in consequence of the "difficulty of keeping the *strings* in tune," they were removed in 1763.

5. Magdalene College, Oxford. 1740.

6. Litchfield Cathedral.

Removed in 1789.

7. St. Mary's, Warwick.

8. Stratford upon Avon Church.

Now removed.

30. *The Jordans, Father and Son.*

Sir John Hawkins, in his *History of Music*, tells us—"About the year 1700, one Jordan, a distiller, who had never been instructed in the business, but had a mechanical turn, and was an ingenious man, betook himself to the making of organs, and succeeded beyond expectation. He had a son, named Abraham, whom he instructed in the same business; he made the organ for the chapel of the Duke of Chandos, at Cannons, near Edgware, and many organs for parish churches*.

These two builders are especially deserving of our notice, as to them we are indebted for the invention of the *swell*. Among the advertisements in the original edition of the *Spectator* (Feb. 8, 1712), is the following announcement: "Whereas, Mr. Abraham Jordan, senior and junior, have, with their own hands, joynery excepted, made and erected, a very large organ in St. Magnus' Church, at the foot of London Bridge, consisting of four sets of keys, one of which is adapted to the art of emitting sounds by swelling the notes, *which never was in any organ before;* this instrument will be publicly opened on Sunday next, the performance by Mr. John Robinson. The above-said Abraham Jordan gives notice to all masters and performers, that he will attend every day next week at the said church, to accommodate all those gentlemen who shall have a curiosity to hear it†.

Many of the old English organs (as we have seen by the specifications quoted) contained a department called the *Echo*. This consisted in a duplicate of the treble portion of some of the stops enclosed in a wooden box, which rendered their sound softer and more distant. Jordan's improvement was that of a sliding shutter, which was made to open and shut at the performer's pleasure, thus producing a "swelling" effect. The invention of the *swell* was well received, and Jordan soon found sufficient employment in carrying out his contrivance in many of the London organs.

With regard to the introduction of this important improvement upon the continent, Burney has some interesting passages in his *Tours*, which we beg leave to extract.

Writing in 1771, he says, "It is very extraordinary that the *swell* which has been introduced into the English organ more than fifty years, and which is so capable of expression and of pleasing effects that it may well be said to be the greatest and most important improvement that ever was made on any keyed instrument, should be utterly *unknown* in Italy; and now I am

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* Although this is the *only* biographical notice of the Jordans handed down to us, yet, strange to say, their names are omitted in the index to the new edition of Hawkins's elaborate work.

† This curious advertisement was first noticed by Malcolm (see his *Londinum Redivivum*, vol. iv, p. 234); it was afterwards copied into Hone's *Every Day Book*, and the *Chronicles of London Bridge*.

on this subject, I must observe, that most of the organs I have met with on the Continent seem to be inferior to ours by Father Smith, Byfield, or Snetzler, in every thing but size! As the churches there are often immense, so are the organs; the tone is indeed somewhat softened and refined by space and distance; but when heard near, it is intolerably coarse and noisy; and though the number of stops in these large instruments is very great, they afford but little variety, being for the most part duplicates in unisons and octaves to each other, such as the great and small 12ths, flutes, and 15ths; hence, in our organs, not only the touch and tone, but the imitative stops are greatly superior to those of any other organs I have met with*."

Again, in another of his works, a few years later, he says, "Before I left England, M. Snetzler had told me that I should doubtless find *swells* in Berlin organs, though he was not certain that this improvement, which was English, had been adopted in other places on the Continent; for Mr. Handel, several years ago, had desired him to describe in writing, the manner in which the swell was produced, that he might send it to a particular friend in Berlin, who very much wished to introduce it there. But I enquired in vain of musical people in that city, whether they knew of any such machine as a swell, worked by pedals, in any of their organs; no such contrivance had ever been heard of, and it was difficult to explain it."

The first *swell* introduced into Germany appears to have been in Hildebrand's organ for the church of St. Michael, at Hamburgh, built in 1764†. Burney says, "A swell has been *attempted* in this instrument, but with little effect; only three stops have been put into it, and the power of *crescendo* and *diminuendo* is so small with them, that if I had not been told there was a swell, I should not have discovered it.‡"

Very little more remains to be said of the Jordans. In the parish books of St. Giles's, Cripplegate, under the date 1726, "a proposal was made (and accepted) by Abraham Jordan, organist, to take the organ to pieces, the builder having left it in a very imperfect state, and repair it *gratis*, on condition of having his salary secured to him for 21 years§." This entry, we presume, relates to the younger Jordan, whose latest work appears to have been the repair of the Durham Cathedral Organ, in 1748.

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* *Present State of Music in France and Italy*, 8vo. 1771, p. 375.

† *Present State of Music in Germany, the Netherlands, and United Provinces.* 8vo. second edit. 1775, vol. ii, p. 103.

‡ Ibid. p. 275.

§ Malcolm's *Londinum Redivivum*, vol. iii, p. 279.

List of Organs built by the Jordans.

1. St. Michael's, Paternoster Royal. 1700.

In the Parish Clerks *Remarks on London*, 1732, it is said that this church has "no organ." Tradition, however, says that an instrument was given to this church by Abraham Jordan, in the year 1700.

2. Fulham Church, Middlesex. 1701.

An excellent instrument; it still remains in almost its original state.

3. The Chapel of the Duke of Chandos, at Cannons. 1712.

Handel used to perform upon this organ. When the Duke of Chandos died, the magnificent mansion being thought to require an establishment too expensive for the income of his successor, was pulled down, and the materials sold by auction in the year 1747. The organ, by the Jordans, forms an item in the sale catalogue. It is said to be now in Spa Fields Chapel.

4. St. Magnus the Martyr, London Bridge. 1712.

This organ was the gift of Sir Charles Duncomb. It is exceedingly interesting, as being the first instrument in which the swell was used. (See the curious advertisement, *ante*, p. 97.) It has been much altered and modernized by Parsons; three only of the original four sets of keys remain.

5. St. Bennet Fink, Threadneedle Street.

"Madam Sarah Gregory of this parish, gave four hundred pounds for building an organ, and a gallery for it; which is now perfectly finished, and built by Mr. Jordan, besides ten pounds per *annum* to keep it up." Paterson's *Pietas Londinensis*, 1714.

6. St. Dunstan's, Fleet Street.

Ascribed to Jordan, upon the authority of William Russell's MS. account of English Organs. It is not mentioned by Hatton in 1708, or Paterson in 1714: but is noticed in the Parish Clerks *Remarks on London*, 1732. It must therefore have been erected some time between the two last-named dates.

7. Parish Church, Southampton. 1731.

In the St. James's *Evening Post*, for Feb. 13th and 24th, 1731, the following satirical notice occurs: "Whereas it has been advertised, that an organ had been lately set up by the ingenious Mr. Jordan, in the parish church of Holy-rood, in the town and county of Southampton; this is to give notice, that the churchwardens of the same parish are willing to shew all manner of encouragement to any one who shall offer himself as organist, provided he understands nothing of his business; the candidates to be approved of by the clerk of the said parish, who, according to his profound judgment and skill in music, promises, on his part, to determine the controversy fairly and impartially in favour of him that shall perform the worst."

"N.B. If any one, who is an ingenious man in his profession (though never so strongly and with justice recommended by the ablest masters in the kingdom), should, notwithstanding this advertisement, presume to offer himself, he must expect to be rejected: it being fully resolved that none but bunglers, or those who know the least of their business, shall be entitled to the place. The latter are desired to meet in the said town of Southampton, on Lady-day next, being the 25th March, 1731, where they may be assured to find a very kind reception and a suitable encouragement."

8. St. Luke's, Old Street. 1733.

A MS. note by Pennant (the London Historian) ascribes this organ to Jordan. The church was consecrated by Dr. Hare, Dean of St. Paul's and Bishop of Chichester, Oct. 18, 1733. The organ was presented to the parish by Mr. Buckley, an eminent brewer of Old Street.

9. St. Paul's, Shadwell.

10. The Portuguese Chapel.

11. St. Antholin's, Watling Street.

12. The Abbey Church, Bath.

31. *Richard Bridge.*

This artist enjoyed considerable celebrity, and it is to be regretted that nothing is known of his biography. According to an advertisement in the *General Advertiser,* for Feb. 20, 1748, "Bridges, organ-builder," probably the same person, then resided in Hand Court, Holborn. We learn incidentally, from a note in Burney's *History,* that he died before 1776.

Organs built by Richard Bridge.

1. St. Bartholomew the Great. 1729.

2. Christ Church, Spitalfields. 1730.

This is esteemed the maker's best instrument. Its original cost was £600, not half its value. In point of number of pipes and stops, it is one of the largest parish organs in London.

3. St. Paul's, Deptford. 1730.

4. St. George's in the East. 1733.

5. St. Anne's, Limehouse. 1741.

6. St. Leonard's, Shoreditch. 1757.

7. Enfield Church, Middlesex. 1753.

8. Eltham Church, Kent.

32. *Organs built by Byfield, Jordan, and Bridge, conjointly.*

In consequence of the many new churches that were erected at the commencement of the last century, an equal number of organs were required, which induced many persons who were totally unskilled in the art and mystery of voicing organ-pipes to become builders. To prevent, therefore, the sad consequences which must naturally follow, a coalition was formed between the three eminent artists of the day, Byfield, Jordan, and Bridge; who undertook to build organs at a very moderate charge, and to apply their united talents to each. The result of which was a fair, though moderate, compensation to themselves, and superior instruments to our churches.

The writer regrets that he can name only three instruments in which the joint efforts of these eminent men were united.

1. St. Dionis Back-Church, City.

Hatton, whose *New View of London* was published in 1708, says, "this church has no organ." Paterson, in 1714, is silent on the subject. But the Parish Clerks *Remarks on London*, 1732 (p. 57), notices an organ in this church. It was therefore set up between the years 1714 and 1732.

This magnificent instrument is in its original state.

2. Yarmouth Church, Norfolk. 1733.

An instrument celebrated for its many beauties.

3. St. George's Chapel, Yarmouth.

33. *John Byfield, Jun.*

This is the next builder that comes under our notice. Nothing whatever is known of his biography; in fact, he is not named, as far as we can learn, by any writer upon the subject of organs, or organ building. The works of the two Byfields pass current under one head.

According to a MS. Note of Dr. Benjamin Cooke's, he died in 1774.

Organs built by John Byfield, Jun.

1. The Chapel of Greenwich Hospital.

Destroyed in the fire which consumed the chapel in 1779.

2. St. Botolph, Bishopsgate. 1750.
3. Christ Church Cathedral, Dublin. 1751.
4. St. Mary's, Rotherhithe. 1764.
5. Grantham Church, Lincolnshire. 1767.
6. St. John's College, Oxford. 1768.
7. Magdalen College Hall, Oxford.
8. Berwick Street Chapel, Soho. 1768.
9. The Theatre, Oxford. 1768.
10. Barking Church, Essex. 1770.
11. Newbury Church, Berks. 1770.
12. St. Mary's, Islington. 1771.
13. Reading Church, Berks. 1771.

The six last-named organs were built jointly with Green.

34. *Messrs. Glyn and Parker.*

The above names are new in the annals of organ-building, as their celebrity was rather of a local character. They resided at Salford, near

Manchester, and built a number of instruments for Lancashire and the neighbouring counties. One organ, that of Poynton church, attracted the notice of Handel, who is reported to have been so pleased with it, that he employed Parker to erect the famous instrument for the Foundling Hospital*.

The following is a list of organs by these builders.

Organs built by Glyn and Parker.

1. Collegiate Church, Manchester. 1730.
2. St. Ann's Church, Manchester.
3. St John's Church, Manchester.
4. Bury Church, Lancashire.
5. Poynton Church, Lancashire. 1748.
6. Chapel-on-the-Frith, Derbyshire.
7. Prestbury Church, Gloucestershire.
8. Leek Parish Church, Staffordshire.
9. Foundling Hospital, London. 1749.
10. All Hallows the Great, Thames Street. 1749.

35. *John Snetzler.*

This truly eminent builder was born at Passau, in Germany, about the year 1710, where several of his organs are still to be seen. He acquired some fame by his restoration of the Cathedral Organ in that city, and was afterwards induced to settle in England. After building several excellent organs, he erected the noble instrument at Lynn Regis, in Norfolk, being recommended to the Corporation of that town by Dr. Burney. The double Diapason and Dulciana stops in this organ were novelties which attracted attention, and fully established his fame in this country.

Snetzler had but an imperfect pronunciation of the English language, which gave him, like many foreigners, a very quaint way of expressing himself. Two stories are current of his peculiarities in this respect. One was,

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* Dr. Burney, in his "Sketch of the Life of Handel," prefixed to his *Account of the Commemoration*, 4to. 1785, says, "The organ in the chapel of this hospital was a *present* from Handel." But how are we to reconcile this statement with the following notice in the *European Magazine* for February, 1799?—"Handel *did not give* the organ to the Foundling Hospital. It was built at the *expense* of the charity, under the direction of Dr. Smith, the learned Master of Trinity College, Cambridge, who added demitones, &c. and some of the niceties not occurring in other organs." Handel conducted the performance at the opening of this organ in 1749.

on the occasion of the erection of his new organ at Halifax, in Yorkshire. Wainwright (afterwards Dr. Wainwright, and organist of the Collegiate Church, Manchester) and Herschel (subsequently known as the great Astronomer) were amongst the candidates for the situation of organist. The former so annoyed Snetzler by his rapid playing, that he paced the church, exclaiming "He do run over de keys like one cat, and do not give my pipes time to speak." He also told the Churchwardens of Lynn, upon their asking him what their old organ would be worth if repaired, "If they would lay out a hundred pounds upon it, perhaps it would be worth fifty."

Snetzler lived to a very advanced age, and died either at the end of the last, or the commencement of the present century. He is said to have saved sufficient money to return and settle in his native country, which he accordingly did; but, having been so long accustomed to London porter and English fare, he found in his old age that he could not do without them, so he came back to London, where he died.

Organs built by Snetzler.

1. Finchley Church, Middlesex. 1749.
2. St. Paul's, Sheffield. 1750.
3. St. Mary's, Hull, Yorkshire. 1750.
4. St. Margaret's, Lynn Regis, Norfolk. 1754.

Built under the superintendence of Dr. Burney, at a cost of £700.

5. Christ Church, Broadway, Westminster. 1760.

This organ is said to have been originally built for the Duke of Bedford.

6. Leatherhead Church, Surrey. 1760.
7. Halifax Church, Yorkshire, 1766.
8. Louth Church, Lincolnshire. 1769.
9. Beverley Minster, Yorkshire. 1769.

This organ was opened with the performance of two Oratorios, Sept. 20 and 21, 1769.

10. Richmond Church, Surrey. 1770.
11. Edmonton Church, Middlesex. 1772.
12. St. Martin's, Leicester. 1774.

A remarkably fine instrument.

13. Scarborough Church, Yorkshire. 1780.
14. Pontefract Church, Yorkshire.
15. Chesterfield Church, Derbyshire.
16. St. Mary's, Nottingham.
17. Huntingdon Church.

18. Rotherham Church, Yorkshire.

19. Whitehaven Church, Cumberland.

20. St. John's (anciently St. Augustine's), Hackney.

21. St. Clement's, Lombard Street, City.

22. St. Margaret's Chapel, Bath.

23. St. Peter's College, Cambridge.

This instrument is remarkable for having the Echo (the predecessor of the swell) remaining.

24. The German Lutheran Chapel in the Savoy.

According to the late Charles Wesley, this was the first instrument in this country provided with a pedal clavier.

25. The German Calvinist Church, Savoy.

Presented by the builder.

36. *Messrs. Crang and Hancock.*

Crang was a Devonshire man, and, after settling in London, became a partner with Hancock, a good voicer of reeds. Hancock added new reeds to many of Father Smith's organs. Crang appears to have been chiefly employed in altering the old echos into swells. He made this improvement in the organs of St. Paul's Cathedral; St. Peter's, Cornhill; St. Clement Danes; &c.

The only organs of these builders known to the writer, are St. John's, Horsleydown, built in 1770, and a fine instrument at Barnstaple.

37. *Samuel Green.*

Although generally considered a cotemporary of Snetzler, this eminent artist was not born till 1740; thirty years after the birth of the former. In all probability he was brought up in the establishment of Byfield, Bridge, and Jordan, as in the earlier part of his career he was in partnership with the younger Byfield. He seems to have been greatly patronized by King George the Third, and, in consequence, to have been employed in all parts of the kingdom.

The organs built by Green are characterized by a peculiar sweetness and delicacy of tone, entirely original; and, probably, in this respect he has never been excelled.

"We possess more Cathedral and Collegiate organs of this builder's construction than of any other; and, although patronized as he was by his Majesty George the Third, and long at the head of his profession, this admirable artist scarcely obtained a moderate competency. His zeal for the mechanical improvement of the organ consumed much of his valuable time in experimental labours, which to him produced little or no emolument; and

it is painful to know that a man so eminent in his profession should not, at his deeease, be able to leave even a slender provision for his family*."

The newspapers of the day record "Mr. Samuel Green, organ-builder to the King, died at Isleworth, Sept. 14, 1796, at the age of 56."

The following list of Green's organs is taken *verbatim* from the *Gentleman's Magazine* for June, 1814, as extracted from the Builder's own Account Book. We have added a few dates, &e. in brackets.

Organs built by Samuel Green.

Cathedral and Collegiate Organs.

1. Canterbury (1784).
2. Wells (1786).
3. Windsor (1790).
4. Litchfield (1789).
5. Salisbury (1792).
6. Rochester (1791).
7. Bangor (1779).
8. York (restoration only).
9. Cashel (1786).
10. New College, Oxon (restoration only).
11. Trinity College, Dublin.
12. Winchester College (1780).

London Organs.

13. St. Katherine's Hospital (1778).
14. St. Botolph, Aldersgate Strect.
15. St. Peter-le-Poor.
16. St. Mary at Hill.
17. St. Michael's (Cornhill).

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* *Christian Remembrancer*, Jan. 1834. One of a series of excellent papers on old organs and organ-builders.

18. St. Olave's, Hart Street (1781).
19. Broad Street Chapel, Islington.
20. Magdalen Chapel.
21. Freemasons' Hall.

Local Organs, &c.

22. St. Petersburg.
23. Greenwich Hospital (1789).
24. Sleaford, Lincolnshire.
25. Manchester (St. Thomas Ardwick, 1787).
26. Helston, Cornwall (1799).
27. Walsal, Staffordshire.
28. Wrexham.
29. Wycombe.
30. Nayland, Essex.
31. Wisbeach, Cambridgeshire (1789).
32. Cirencester.
33. Macclesfield.
34. Stockport (St. Peter's, 1788).
35. Bath.
36. St. Michael's.
37. Tunbridge.
38. Loughborough.
39. Tamworth.
40. Walton.
41. Leigh.
42. Chatham.
43. Bolton (Lancashire, 1795).
44. Crambourne, Cornwall.
45. Aberdeen Episcopal Chapel.
46. Kingston Church, Jamaica.

38. *John Avery.*

Very little is known of this builder. He is said to have been a dissipated eharaeter: he was eertainly an exeellent workman. The dates of his organs range between 1775 and 1808. He died in the latter year, during the time he was engaged in finishing the organ of Carlisle Cathedral, his last work.

Organs built by Avery.

1. St. Stephen's, Coleman Street, City. 1775.
2. Croydon Chureh, Surrey. 1794.

Avery considered this instrument his best work.

3. Winehester Cathedral. 1799.
4. Christ Chureh, Bath. 1800.
5. St. Margaret's Chureh, Westminster. 1804.
6. King's College Chapel, Cambridge. 1804.

The case of this organ is of the time of Henry VIII, the date of the stalls.

7. Seven Oaks Chureh, Kent. 1798.
8. Carlisle Cathedral, 1808.

39. *The Englands, Father and Son.*

These two organ-builders are generally confounded. George England flourished between the years 1740 and 1788, and George Pike England (his son) between 1788 and 1814.

The elder England built many noble organs, a few of whieh we shall enumerate.

Organs built by George England.

1. St. Stephen's, Wallbrook. 1760.
2. Gravesend Chureh, Kent. 1764.
3. Ashton-under-line, Laneashire. 1770.
4. St. Michael's, Queenhithe. 1779.
5. St. Mary, Aldermary. 1781.

The last two organs were built in conjunction with Hugh Russell.

6. St. Matthew's, Friday Street.
7. St. Mildred's, Poultry.
8. German Lutheran Church, Goodman's Fields.
9. The Chapel of Dulwieh College.

With regard to the son, our information is more satisfactory; the following list of organs built by him being copied from his own account book, kindly lent to the writer by Mr. Hill, the eminent organ-builder.

Organs built by G. P. England.

1. St. George's Chapel, Portsmouth Common. 1788.
2. St. James's Church, Clerkenwell. 1790.

This organ cost £500 and the old organ, which was valued at £105. It was afterwards sold by England to the parish church of Beccles, Suffolk, for £220.

3. Fetter Lane Chapel. 1790.
4. Warminster Church, Wiltshire. 1791.
5. The Adelphi Chapel. 1791.
6. Gainsborough Church, Lincolnshire. 1793.
7. Newington Church, Surrey. 1794.
8. Blandford Church. 1794.
9. Carmarthen Church, South Wales. 1796.
10. St. Margaret's, Lothbury. 1801.
11. The Sardinian Chapel. 1802.
12. Newark Church, Nots. 1803.
13. Parish Church, Sheffield. 1803.

This organ cost £770.

14. St. Philip's, Birmingham. 1805.
15. St. Martin's Outwich. 1805.
16. Hinckley Parish Church. 1808.
17. Stourbridge Church. 1809.
18. Richmond Church, Yorks. 1809.
19. High Church, Lancaster. 1809.

This organ cost £672.

20. Shiffnall Parish Church. 1811.
21. Ulverstone Parish Church. 1811.
22. St. Mary's Chapel, Islington. 1812.

40. *Progress of Organ Building in Germany.*

During the eighteenth century, Germany was especially prolific in large organs, and most of these instruments still remain as honourable memorials of the talents of their builders.

41. *Andreas Silbermann.*

Amongst the most renowned organ-builders that the world has produced are the celebrated Silbermann family. The founder of this race of talented men was Andreas Silbermann, born at Frauenstein, in Saxony, in 1678. The particulars of his life are not recorded; but, during the space of twenty-seven years in which he flourished, he built thirty organs. He died in 1733.

Organs built by Andreas Silbermann.

1. St. Nicholas, Strasburg. 1707.
2. Convent of St. Margaret, Strasburg. 1709.
3. Protestant Church of St. Pierre, Strasburg. 1709.
4. Mauerstein, Lower Rhine. 1710.
5. Basle Cathedral. 1711.
6. Convent of Guillelmines, Strasburg. 1712.
7. Oberenheim. 1713.
8. Giedertheim. 1715.
9. Strasburg Cathedral. 1716.
10. St. Etienne, Strasburg. 1716.
11. Andlau. 1717.
12. The Madeleine Convent, Strasburg. 1718.
13. Ebersheimmünster. 1718.
14. St. Leonard's, Basle. 1718.
15. Hanau. 1719.
16. Grendelbach. 1719.
17. Lautenbach, Upper Rhine. 1719.
18. St. Jean, Weissemburg. 1720.
19. St. Leonard's, near Oberenheim. 1721.
20. Altenheim, near Offenburg. 1722.
21. Kolbsheim. 1722.
22. Church of the Dominicans, Colmar. 1726.
23. St. Guillaume, Strasburg. 1728.
24. Bischweiter. 1729.
25. Altorf, Lower Rhine. 1730.
26. Ebersheimmünster, Lower Rhine. 1731.

27. Kœnigsbrük Abbey, Lower Rhine. 1732.
28. Hospital Chureh, Colmar. 1732.
29. Protestant Chureh, Colmar. 1733.
30. Rosheim. 1733.

42. *Gottfried Silbermann.*

Gottfried Silbermann, brother of the preeeding, was born at Frauenstein, in 1684. After remaining some years in the workshop of his brother, he went into Franee, where, we are informed, "he worked and resided many years*." He was the inventor of the "Claveein d' amour," and one of the earliest makers of the pianoforte. He died in 1754, during the period in whieh he was engaged on the Royal Catholie Chureh Organ at Dresden, whieh noble instrument was eompleted by his nephew, Jean Daniel Silbermann.

Organs built by Gottfried Silbermann.

1. Freiberg Cathedral. 1714.
2. St. Pierre, Frieberg. 1720.
3. The Royal Chureh of the Evangelists, Dresden. 1720.
4. St. Sophia, Dresden. 1722.
5. Chureh of Notre Dame, Dresden. 1736.
6. Poenitz, near Altenburg. 1737.
7. The Royal Catholie Chureh, Dresden. 1754.

43. *Johann Andreas Silbermann.*

This braneh of the Silbermann family was the eldest son of Andreas, and eonsequently the nephew of the last named. He was born at Strasburg, where his father resided, in 1712. He enjoyed eonsiderable reputation as an organ-builder, and was beloved by his fellow eitizens for his soeial qualities. He died at Strasburg in 1783, with the title of Member of the Couneil of that eity, leaving two sons, one of whom, Johann Josias, afterwards distinguished himself as a maker of musieal instruments.

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* Burney tells us that "The French organ-builders are much esteemed by the Germans themselves, for the simplicity of their movements and the mechanism of the whole."—*Tour in Germany*, vol. i, p. 21. During the period that Gottfried Silbermann studied in France, the best builders were Charles Dallery and Francois Clicquot. These builders chiefly worked together, and among their organs we may name those in the churches of St. Gervais, St. Nicolas des Champs, St. Méry, St. Sulpice, the Chapel at Versailles, and the Abbey of Clairmarais. Pierre Dallery built the organ of Notre Dame, and those in the Churches of St. Lazarre and St. Suzanne, at Paris. A descendant, Pierre Francois Dallery, was living as late as 1833.

Johann Andreas Silbermann built fifty-four organs, the most important of which are:

1. St. Thomas, Strasburg.
2. The College of Colmar.
3. St. Etienne, Basle.
4. St. Theodore, Basle.
5. The Abbey of St. Blaize in the Black Forest.

44. *Johann Daniel Silbermann.*

This builder, the last of the family whom we shall particularize, was the second son of Andreas. He was born in 1717, at Strasburg, and studied organ-building under his uncle Gottfried, at Dresden. Upon the death of the latter, in 1754, whilst constructing the noble organ of the Royal Catholic Church at Dresden (as we have before mentioned), he succeeded to his uncle's business. He died at Leipzig, in 1766.

45. *Cotemporaries and Successors of the Silbermanns.*

The family just mentioned had many cotemporaries and successors, some few of which, if not equally eminent, are deserving of a notice in these pages. Zacharius Thessner built, in 1702, the great organ in the Cathedral of Merseberg: it had 68 registers, 5 manuals, and pedal. Adam Sterzing built, in 1707, a noble organ for the Court Church at Eisenach: it had 58 registers, 4 manuals, and pedal. Eugenius Casparini (then an aged man), in conjunction with his son Adam Horatius, built, in 1703, an organ for the Church of St. Peter and St. Paul at Göerlitz, in Upper Lusatia: it had 82 registers, 57 of which were whole stops. Henrich Herbst and his son built, in 1718, an organ at Halberstadt, with 74 registers, 3 manuals in front, 2 manuals at the sides, and pedal.

Michael Engler of Silesia, who flourished between 1688 and 1760, built many noble instruments; amongst which we may instance those in the churches of Saint Salvator and Saint Elizabeth at Breslau. He was succeeded by his son and grandson, Theophilus Benjamin, and Jean Theophilus. The latter flourished between 1775 and 1822.

Johann Michael Roder, of Berlin, built the great organ in the Church of St. Mary Magdalen, at Breslau. It was erected in 1726. Then we have Joachim Wagner, who, in 1725, built the instrument in the Garrison Church at Berlin, of which Dr. Burney has left us a curious description, in his *German Tour*.

The Hildebrands—Zacharie, who flourished between 1680 and 1743, and Johann Gottfried, his son—were eminent artists. The latter built the noble organ in St. Michael's Church, Hamburg, in 1762, at an expense of £4000.

But the two best-known organ-builders of the latter half of the eighteenth century, are Johann Gabler of Ulm, and Christian Müller of Amsterdam; the former, by his glorious organ in the Benedictine Abbey of Weingarten; the latter, by the "world-famed" Haarlem Organ.

THE ORGAN,

A

COMPREHENSIVE TREATISE, &c.

BY

EDWARD J. HOPKINS.

THE ORGAN.

PRELIMINARY OBSERVATIONS.

THE Organ, as it is usually met with in cathedrals and large churches, is divided interiorly into four principal parts. The chief of these divisions or *departments* is that styled the Great Organ; the others are the Pedal Organ, the Choir Organ, and the Swell Organ.

These several departments are, in one sense, so many separate and distinct organs. This is the case so far, that each has its own *sound-board*, *stops*, *clavier*, &c.; but the whole of them being generally enclosed in one case (the choir organ sometimes excepted), with the different claviers so arranged as to be under the control of one performer, they are thus made to assume the appearance of one vast and comprehensive instrument. The choir organ is occasionally enclosed in a separate case, placed in front of and below the chief one: as at St. Paul's Cathedral; St. Sepulchre's, Snow Hill; St. Lawrence, Jewry; &c.: though not so arranged as to give it the appearance of being a detached portion, but harmonizing with the main body of the instrument; so that, when viewed from the church, the two present one handsome and noble façade.

The several departments above named have, generally speaking, certain fixed situations allotted to them in the organ. For instance:

The Great Organ is generally placed immediately behind the front pipes of the instrument (see *fig.* 1); many of which "show pipes" form a portion of those belonging to that department.

The Choir Organ, when not located "in front," is stationed behind and at a convenient distance from the great organ (*fig.* 2), a foot-way (marked 3, in the general section) about a foot wide, being left between the two, as a pathway for the convenience of tuning, &c. called the *passage-board.*

The Swell Organ is placed above the choir organ, when the latter is not situated in front (*fig.* 4). In small instruments, where the choir organ is altogether omitted, the swell is often stationed over the great organ.

The Pedal Organ is either placed, in an entire state, behind and parallel with the others (as shown in *fig.* 5), or it is divided, and a part arranged on each side of them. When there is no choir organ, or when that department appears in front, the pedal organ is frequently stationed to the rear of the great organ (occupying the usual position of the choir organ), with the swell above.

The structural portions of an organ are classed into three great divisions; namely, (1) the machine by which the wind is collected for the production of sound, the channels through which it is conducted to the various departments of the instrument, and then redistributed among the numerous pipes of each; (2) the mechanism by which the several departments are individually or conjointly brought into use, and their stops brought under perfect control; and (3) the sound-producing parts—namely, the pipe-work.

These several divisions, together with the case, constitute what is known, *par excellence*, as "THE Organ;" the construction and operation of which form the subject-matter of the following chapters.

DIVISION I.

THE EXTERIOR OF THE ORGAN.

CHAPTER I.

THE ORGAN-CASE.

Its nature and use, and the materials of which it is formed.

1. MOST organs are enclosed, at the back, sides, and front, in a case of wood—a covering of the greatest service to the instrument, as it protects the mechanism and pipe-work from external injury, and renders the working of its movements, when in operation, less audible. The case, moreover, is of great utility in rendering the instrument an ornament to the church, by bringing its appearance into perfect keeping with the other carved wood-work of the edifice. The organ-case is usually constructed either of oak, mahogany, walnut-tree wood, or of deal. When made of the last-mentioned material, it is either grained to imitate one of the fore-mentioned woods, or it is stained. The case to the choir organ, in the chapel of Magdalen College, Oxford, is of stone.

The general structure of the organ-case, and the means of ingress.

2. The organ-case is usually divided into two stages, either by an impost or by a bold horizontal moulding; and, vertically, into numerous *compartments*, by pilasters or by buttresses. The compartments below the impost are usually filled in with panelling work all round, except in front, towards the centre, where the claviers are, generally speaking, located. The upper divisions are also similarly filled in with panelling work, except where intended to receive pipes. Some of the panelled parts are hung on hinges, or are otherwise made moveable, so as to form entrance doors, for the purpose of tuning, or for facilitating admittance to the mechanism and other work.

3. The front of the organ-case above the impost is generally formed into a series of open-work compartments—an arrangement that is so far advantageous to the tone of the instrument, that it admits of many of the pipes of some of the chief stops being placed in these openings, whereby the predominance of their tone is more effectually secured; the interstices between the bodies and feet of the pipes being calculated to assist the egress of the sound produced by those inside.

The general arrangement of the front pipes.

4. The front pipes never succeed each other according to the sound they produce in the musical scale, like the keys, semitonally; for, in that case, all the large ones would be on one side, and the small on the other, like the strings of a harp; but they are placed so as to present a symmetrical appearance.

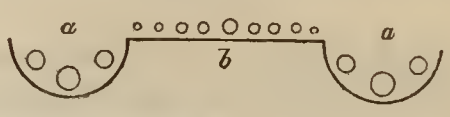
5. The first and most obvious arrangement is into groups of large and small pipes, forming separate compartments. The admixture of these large and small compartments constitutes one of the principal features in the design.

The various figures in which the front pipes are arranged.

6. Next, the pipes occupying the large and small compartments are arranged according to many different plans, and in varied forms, with the view to gaining greater contrast and elegance in the appearance of the organ.

7. The chief of these diversified figures, and the names by which they are known, are as follow:

8. Pipes that are placed in a projecting semicircle are said to form *Towers.* (See *a a, fig.* 6.) Examples of this kind of pipe-arrangement occur in the graceful cases of the organs at Whitehall Chapel; St, Clement's, Strand; and indeed in most organs.



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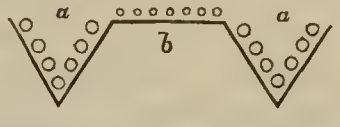
9. Pipes standing in an angle are termed *Pointed Towers* (*a a, fig.* 7); specimens of which may be seen at St. Sepulchre's, Snow Hill; and at St. Nicholas's, Newcastle-on-Tyne.



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10. Groups of pipes inclining inwards, semicircularly, are said to form *Niches* (*b, fig.* 8); of which an example occurs in the centre of the case of the organ at St. Philip's, Stepney.

8

11. A *Breasted* compartment is that of which the middle part is a little rounded, forwards; as shown at *a*, in *fig.* 9. Examples occupy the centre of the handsome organ cases at St. Mary's, Islington; and St. John's, Horsleydown.

9

12. If the pipes are placed curvilinearly, the compartment is said to be of the *Ogee* form. (See *fig.* 10,) Of this kind of pipe-arrangement, examples exist at St. Olave's, Southwark; and at St. Helen's, Bishopsgate.

10

13. When the pipes are continued in a straight line, they are called *Flats.* (See *figures* 11, 12, 13, 14; also *b b, figs.* 6 and 7.)

14. Some organ-cases have what are denominated *Flat Towers;* of which very fine examples occur at St. Paul's Cathedral. Such are formed by arranging the pipes, that in some organ-cases stand in a semi-circle or in an angle, parallel-wise. Others, again, have what are called "circular ends;" i. e. the case, instead of being flanked at each side by a tower, has a curved compartment, resembling half a circular tower, furnished with a greater number of narrow pipes. The organ at Exeter Hall has circular ends.

The arrangement of the front pipes in regard to the sound they produce.

15. The front pipes are generally planted in tonal succession in *each half* of the case; that is to say, those which occur in the compartments to the left of the centre, give one or other of the following six sounds; namely, C, D, E, F sharp, G sharp, or A sharp: the

pipes occupying those to the right, sounding either C sharp, D sharp, F, G, A, or B. This alternate distribution may readily be discovered by, first, drawing the open diapason, or whatever other stop may have most of its pipes appearing "im prospect" (as the Germans have it), and then slowly playing the chromatic scale in its ascending form; when the sounds will be observed to proceed first from the left, and then from the right hand side of the front. Occasionally, however, the order is reversed.

16. As to the precise *situation* in the front where these alternate speaking pipes will be found, this depends on the design of the case. It will, however, generally be found that the pipe which on the second side *replies* to a particular one on the first, will occupy the corresponding position *on* the second side. Thus, supposing the CC pipe of the open diapason to stand in the middle of the tower on the left side of the case, the CC sharp pipe will probably be in the centre of the similarly situated tower on the right: the DD and EE pipes will stand one on each side of the CC; while those giving DD sharp and FF will appear immediately on the right and left respectively of the CC sharp pipe.

17. The alternate assortment of the front pipes materially facilitates the power of giving to the organ a symmetrical appearance. The CC sharp pipe differs so slightly from the CC in its diameter (in a decreasing ratio), that the eye fails, at a distance, to discover the deviation; hence the two pipes—as indeed any other two, of which the sounds are only separated by a semitone—are placed in corresponding positions, without the slightest ill, but, on the contrary, good, effect resulting.

18. The necessary deviation in *length*, however, would be sooner detected; hence both pipes are made to agree in this respect; but the one that is to give the higher sound has an opening cut in the back, at the top, which produces the same influence as slightly shortening the pipe.

19. The next pipe on the "CC side," FF sharp (supposing the towers already spoken of to contain three pipes each only), will probably appear in another compartment; perhaps in a smaller tower, or in a flat, or in one of the ogee or the breasted form; and so on. When the pipes become too small to appear externally, the few remaining ones are disposed inside, and members of other stops brought into prominence, if more pipes are required in sight to complete the design.

20. The pipes in the flats are arranged in a far greater number of different ways than are those in the towers. In compartments of the fore-mentioned kind, the largest pipes are sometimes placed outside, and the small ones in the middle, as represented in *fig.* 11:

11

at others, the small ones occupy the extreme positions right and left, and the large ones the centre (*fig.* 12):

12

while occasionally they are disposed in a graduated series; the largest being at one end, and the smallest at the other; as in *figs.* 13 and 14:

13

14

Of the decoration of the front pipes.

21. The surface of the front pipes of most English organs is adorned with gilding. In former times, the front pipes were more commonly *diapered;* i. e. figured in various colours; and many of Smith and Harris's organs were so ornamented. That, by the former builder, at Finedon, in Northamptonshire, still retains its original embellishments of this nature: so also does the old organ in the chapel of Christ College, Cambridge. A few instances have of late occurred of the revival of this kind of pipe-decoration. The instruments in Westminster Abbey and the Temple Church have their front pipes both gilded and diapered.

22. The front pipes of the organs in Holland, some parts of France, and most of the German states, being frequently made of pure tin, are simply polished or burnished, giving them the handsome appearance of bright silver.

DIVISION II.

THE WIND-COLLECTING PORTION OF THE ORGAN.

CHAPTER II.

THE BELLOWS.

Their use.

23. The use of the bellows is to collect and enclose a quantity of atmospheric air; and, after compressing it, to propel it through the various wind-channels up to the pipes. These are, in fact, the lungs of the organ: without their aid, it would be but a voiceless machine.

The different kinds of organ bellows ordinarily met with; which the oldest; their names; and why so called.

24. There are two kinds of bellows to be met with in church organs; namely, *diagonal* and *horizontal* bellows. Of these two varieties, the diagonal is the older kind; previous to the introduction of which, organ bellows were made very similar to those still used in smith's forges. But such primitive machines, from being made chiefly of leather, were liable to frequent injury from the friction to which their folds were unavoidably subject whenever they were worked; and their constantly recurring unsoundness from this cause, gradually led to the adoption of a more durable material in their construction. Thus wood came to be used in lieu of leather for the folds (with leather for the hinges), which substitution rendered the bellows far less liable to destruction from attrition. Of this more substantial kind of bellows, specimens are still occasionally to be seen in the small cabinet organs of Father Smith. In the church organs, however, of that celebrated artist, and also in those of his worthy competitor, Harris, only diagonal bellows—the kind represented in *fig.* 15—were used. These bellows are said by some to have been first introduced by Lobinger, of Nuremberg, in 1570. According to other accounts, they were invented by Hennings, of Hildesheim, in the seventeenth century. At any rate, they were of German origin.

25. The diagonal bellows continued to be almost exclusively* employed in church organs till towards the latter part of the last century, when a new kind was brought forward in this country, which was considered, by the English organ-builders of the time, to present so many advantages over that previously used for church-work, that,

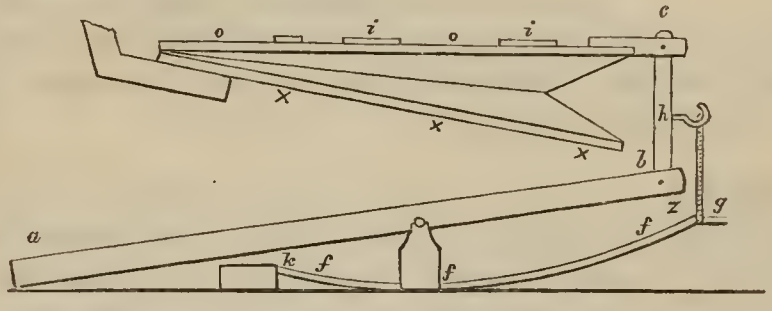
* It will have been seen, from one of the illustrations in the historical introduction, that a reservoir similar to the upper member of a horizontal bellows was known in the time of Praetorius, 1620; but, being made without a feeder, it was the same in principle as the old diagonal bellows; i. e. it was inflated by raising the top. Although somewhat similar to the modern bellows in appearance, it was as different in the method of its working, as it was inferior in actual utility.

soon after the commencement of the present century, the construction of bellows of the diagonal species was entirely abandoned. The fine organ in St. Margaret's Church, Westminster (built by Avery, in 1804), appears to be one of the latest instruments made with bellows of the single or diagonal kind.

26. At the present time, the horizontal is the only description of bellows made by English and French organ-builders; though, in Germany, the diagonal still remain in greatest favour.

27. The names given to the two kinds of organ bellows sufficiently indicate the distinctive principle upon which each operates. The diagonal—or, as it has sometimes been denominated, the wedge-shaped bellows—is so called because, when blown, the top rises diagonally; that is to say, one end ascends while the other remains stationary; thus giving to the bellows a wedge-shaped appearance (as shown in the following engraving) when charged with air.

15



28. A horizontal bellows (*fig.* 16), on the contrary, preserves its level surface in all stages of its operation, whether it be wholly distended, quite empty, or at any intermediate point between the two extremes. Hence *its* distinctive appellation.

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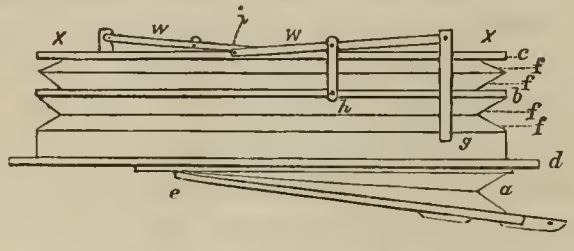

Particulars concerning the diagonal bellows.

29. Diagonal bellows are, as already mentioned, seldom, if ever, now made in England. Numerous specimens, however, still exist in our old town and village church organs. Of such kind of bellows, two, at the least, are found in even the smallest church organs; one for supplying the instrument while the other is being replenished. As, during the process of inflation, the top of the bellows is gradually raised, and therefore the weights on its surface exercise no compressing influence on the contained air, it follows that, for the time being, the wind within that bellows can be of no greater density than the air without, and therefore is of no service in supplying the organ. A practical proof of this fact may be obtained, where there are two diagonal bellows, by pressing the handles of *both* down at once, when the organ will become for the time quite silent. Hence arises the necessity for a second bellows, to supply wind while the first is being charged, and *vice versâ*.

Their number. 30. And while small and moderate-sized organs have from 2 to 6 diagonal bellows, many large instruments have 8, 10, 12, or even as many as 14. Thus the Meresburg organ has 6 bellows; that at Wismar, 8; the organs at Frankfort and Haarlam, 12 each; while that at St. Sulpice, in Paris, had, until lately, 14 bellows. The organ in St. Paul's Cathedral had originally 4 large diagonal bellows, measuring 8 feet by 4.

Arrangement. 31. The several diagonal bellows are usually placed in a row, side by side, sometimes outside the case; or, when too numerous to be so disposed, they are often ranged in *two* rows, one over the other. In the latter case, the upper row of bellows is generally furnished with ropes, by means of which the same blower is enabled to work both rows. The bellows of the organ at the church of St. Ouen, at Rouen (12 in number), are thus situated and worked. The blower depresses the handles of the lower row of bellows as he leisurely walks across the platform behind the organ from one side to the other, and draws down the ropes of the upper row as he returns. In many of the Continental organs, the bellows are inflated by means of treadles instead of handles. The illustration numbered 15 represents a bellows worked in this manner. The treadles lie in a row near the ground, and the blower, stepping from one treadle to another, by his weight lowers each of them, and thus the bellows are distended.

32. The wind supplied by the several diagonal bellows is received into a chief or head canal, consisting of a long square and (generally) horizontally disposed wooden tube; from which canal it is distributed among the several sound-boards, through smaller tubes shooting forth from it and traversing the organ in all necessary directions. Such are the general arrangements for collecting and compressing, for receiving and distributing, the organ-wind. To an enumeration of these, may be added the following details.

Method of operation. 33. Diagonal bellows are blown by pressure upon the near end of the governing handle or treadle (*a*, *fig.* 15). On this descending, the other end (*b*) ascends, raising with it the moveable end of the top of the bellows (*c*). As this is taking place, some of the external air rushes in through the bottom of the bellows, at openings or gratings made for the purpose, and fills the cavity of the bellows. Valves placed over the apertures then fall over them and close in the wind. The surface weights (*i i*) now exercise their influence, by pressing heavily on the top of the bellows (*o o*); and the top of the bellows, by descending, in its turn, forcibly on the enclosed wind, compresses it and so prepares it for use; in which state it rushes towards the chief wind-receiver. As the air in the bellows is by degrees exhausted, the top descends, the handle as gradually rising: when the latter reaches its full height and becomes stationary, it indicates that the contents of the bellows are exhausted. The wind from the several bellows does not enter the receiver at the same time; but that from one bellows is first consumed, and then the supply is continued by the next. So that the bellows do not all sink down together, but one after the other, as is indicated by the consecutive rising of the handles.

34. This successive transmission of the wind from the several bellows is brought under regulation by means of valves or traps, one between each bellows and the chief

wind-receiver, which act in the following manner. The wind from the first bellows not only supplies the organ, but by its force alone keeps the traps of the other bellows closed so long as the wind lasts. When this supply is just exhausted, then the trap of the second bellows suddenly opens, the condensed air from which not only keeps the traps of the remaining bellows still closed, but also shuts that of the one just emptied, and so prevents the entrance of any of the wind which the bellows now in operation is supplying. On the stock of wind from the second bellows being exhausted, the trap of the third opens and continues the supply, that of the second closing; and so on with all the remaining bellows. Sometimes a certain number of the bellows supply one department only of the organ. Thus, of the 14 originally at St. Sulpice, 6 were devoted to the great organ, 4 to the pedal, the remaining 4 supplying the smaller departments of the organ. The description just given must therefore be understood as referring to the working of one set or series of bellows only, of which an organ may contain 1, 2, or 3, according to circumstances.

Their original defects.

35. The diagonal bellows, in their early form, were open to the grave objection of not producing a wind of uniform intensity during the sinking; but a comparatively light one when fully distended, and a gradually increasing one as they collapsed; the consequences being that the organ did not always produce precisely the same strength of tone, neither did it always sound strictly in tune. The causes of this inequality in the strength of the wind were as follow. A diagonal bellows, on being charged with air, would have the top-board (*o o*, *fig.* 15, and *b*, *fig.* 17) raised to its greatest height; the *side* and *end ribs* (*c c*, *c c*, *fig.* 17) taking as nearly a perpendicular position as a regard to the stability of the bellows would allow, and having their *middle joints* or points of conjunction (*d d*) inclined inwards. The sides and end would then present an obtuse angle to the wind; as shown in *fig.* 17, which is a *cross* section of a diagonal bellows. But as the top-board descended, the angle they described would become more and more acute; as illustrated at *e e*, in *fig.* 18. As the contents therefore of the bellows were gradually exhausted, not only was the *height* of the space within the bellows lessened, *but also the length and breadth.* The wind within, consequently, was not simply influenced by the calculated pressure of the surface-weights, but also by the compressing power of the inward folding ribs, which, pressing forward, wedge-fashion, into the confined air, gave it more force.

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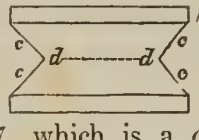

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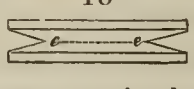

36. Another circumstance that tended to bring about the inequality complained of, was the irregular influence of the surface-weights, which did not press with the same effect on the bellows in all stages of its sinking. A weight will, according to one of the simplest laws of mechanics, operate with its fullest effect only upon a *level* surface. Now, when a diagonal bellows was distended, at which time the top-board presented an *inclined** plane, the weights could only press *obliquely* on the wind, and therefore with something less than their greatest effect. This imperfect pressure gradually disappeared as the bellows closed; that is to say, as the top gradually

* Diagonal bellows were originally fixed with the *under-board* (*x x x*, *fig.* 15) in a perfectly horizontal position.

approached the *horizontal* line ; the result being that the bellows completed its work by the production of a stronger wind than was the case at the commencement of its sinking.

37. These were the defects which existed in the diagonal bellows, as originally made, and which the German organ-builders succeeded in rectifying, by means as simple in their nature as they were successful in their effect.

How remedied.

38. Instead of the bellows being fixed with the under-board (*x x x, fig.* 15) perfectly level, as heretofore, they were now placed with the spreading end somewhat *below* the other end ; as illustrated in *fig.* 15 ; so that, when expanded, the *top* (*o o*), instead of the *bottom*, formed the horizontal line. This slight alteration of position secured to the wind the full influence of the surface-weights (*i i*) at the *commencement* of the bellows' sinking, instead of at the end ; and therefore at the time when the ribs would be producing the *least* effect. As the top descended below the level, the weights would lose some of their influence ; the closing ribs, however, pressing in on all sides, at the same time increased theirs. To counteract the greater influence which the inward folding ribs still exercised, a long wooden spring was applied, which operated during the earlier stages of the bellows' sinking, in addition to the surface-weights ; but by degrees ceased to do so as the influence of the ribs was more and more felt.

39. This spring, consisting of a long rule of box-wood (*fig.* 15, *f f f*) was laid under the bellows, and fastened down at one end (*k*), the other having a rope attached (*g*), communicating with the wooden rod (*h*) that lifts the top of the bellows. On raising the top-board, the rope and free-end of the box-wood spring were drawn up ; the latter, from its own elasticity of course, operating with the greatest force when most curved upwards. Additional compressing power was thus brought to bear upon the wind when the ribs pressed inwards but slightly ; but as they gradually did so more acutely, giving to the wind more strength, the elastic power of the spring gradually became less, and finally became powerless.

40. Thus was a uniform strength of wind secured throughout the sinking of the diagonal bellows.

The horizontal bellows.

41. The hope of securing an equal and satisfactory supply of wind from bellows of the diagonal species, does not seem to have been confidently entertained in England ; for, while Continental organ-builders were engaged in effecting the several improvements just enumerated, with that view, an Englishman, Samuel Green, was seeking to attain the same end by the introduction of a bellows of an entirely different construction. The date of the first introduction of the horizontal bellows is not positively known ; but it would appear to be between the years 1785 and 1790. The beautiful little organs erected in St. Thomas's Church, Ardwick, Manchester, in 1787, and in St. Peter's Church, Stockport, in Cheshire, in 1788, by Green, were both originally furnished with *horizontal* bellows. On the other hand, the organ in Lichfield Cathedral, by the same admirable builder, which was erected a year later, i. e. in 1789, originally had *diagonal* bellows, 3 in number, and which were replaced by new ones of the horizontal species, by Messrs. Kirtland and Jardine, of Manchester, in 1849. The one main fact, at any rate, is

certain, as well as satisfactory—namely, that this great improvement in the art of organ-building is of English origin.

42. A horizontal bellows (see *fig.* 16) comprises two separate and distinct chambers, one immediately over the other. The lower one (*a*), closely resembling a diagonal bellows, is called the *feeder*, from its supplying or "feeding" the upper division with wind. The upper chamber (*x x*) is called the *reservoir*, because it *receives* the great body of wind collected by the feeder for compression, and holds it in "reserve" for after-distribution among the various departments of the organ.

43. One circumstance connected with the horizontal bellows—and a very important one it is—is, that one of this kind will with ease supply an organ that would require perhaps half-a-dozen of the diagonal species. How this should be the case, is soon explained. A feeder, as already stated, closely resembles a diagonal bellows. Now supposing a horizontal bellows to be supplied by a feeder of a given size, and that six full charges therefrom are necessary to fill the reservoir, it follows that the supply from that one reservoir will be as plentiful and efficient as that from six bellows of the diagonal species of the dimensions of the feeder (*a*). This fact is the more apparent, when it is borne in mind that diagonal bellows do not all afford their supply at the same time.

Their structural features.

44. On examining a horizontal bellows, it will be seen to consist of three stout horizontal layers or plates of wood, called respectively the *top-board* (*c*, *figs.* 16 and 23, also *figs.* 19 and 20); the *middle-board* (*d*, *figs.* 16 and 23, also *fig.* 21); and the *bottom-board* (*e*, *figs.* 16 and 23, also *fig.* 22): which "boards" are joined together all round by side and cross-fold boards called *ribs*. (See *f f f f*, in *figs.* 16 and 23; also *figs.* 24, 25, and 26.)

45. The *top-board* is usually made of pine, an inch or more in thickness; and, in small bellows, consists simply of a plain, substantial board, *ledgered* near to each end, as shown in *fig.* 19. The top-board for larger bellows is frequently composed of a stout frame, divided crossways and lengthways by rails, resembling the *stiles*, &c. of a common door (*fig.* 20); with the interstices filled in, or in some instances covered in, with thick wooden panels. Moveable panels offer an easy means of getting at the valves of the middle-board below, if they become deranged from damp, excessive heat, or any other cause.

19

46. The *middle-board* (*fig.* 21) is made of rather larger dimensions than the top-board; a slight additional portion being required all round to form a substantial ridge for the support of the bellows on their sustaining frame-work. This is clearly shown at *d*, in *fig.* 16; also in *fig.* 34. To the middle-board are attached, at the sides and ends, and marking as nearly as may be the outline of the top-board, four thick boards (*e e e e*, *fig.* 21), some four or five inches broad, and set up edgeways (*g*, *fig.* 16), called the *trunk-band*, or *lining*, which "band" permits the various wind-trunks to be joined to the bellows at *any part* most convenient to fix them. See *o* and *v*, *fig.* 23. In some bellows, pieces of wood, of the same *height* as the band,

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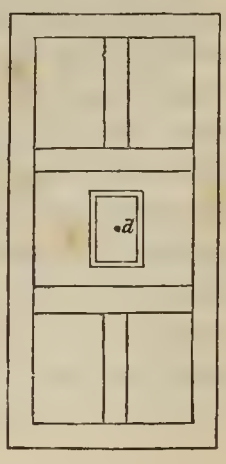
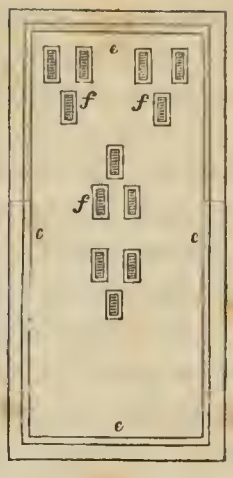


and of the same *width* as the ribs, are placed inside the band, and at right angles to it, which, with the band itself, form a firm resting place for the ribs. Besides this, 3 or 4 posts are inserted down the centre of the middle-board, of the same height as the trunk-band, with the thickness of the ribs, &c., *added*, which bear up the top-board and weights. Or, in very *long* bellows, instead of a few posts, a rib of inch pine (of the same height as the posts) is carried through the whole length of the middle-board (inside the band, glued to the middle-board and screwed through from the under side), which not only supports the top-board *from end to end*, down the middle, but also serves as a *brace* to the middle-board. These several insertions add materially to the stability of the bellows. The middle-board and trunk-band together form a kind of large, shallow trough, in the bottom of which lie the several "valves" or "suckers," marked *f f f* in the adjoining figure. Sometimes the middle-board, like the top, has moveable panels, to facilitate the repairing or cleaning of the valves in the bottom-board, when required.

21



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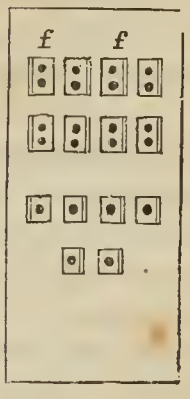

47. The *bottom-board* (*fig.* 22) is made of good substance, like the other "boards" of the bellows. It is provided with suckers, like the middle-board, and forms the bottom to the feeder, as already exemplified in *fig.* 16. It is therefore ledgered on the under side, to prevent its "springing," when in forcible operation. The bottom-board sometimes approaches the top-board in dimensions; at other times, not nearly so; this often depending on the kind of feeder by which the reservoir is fed.

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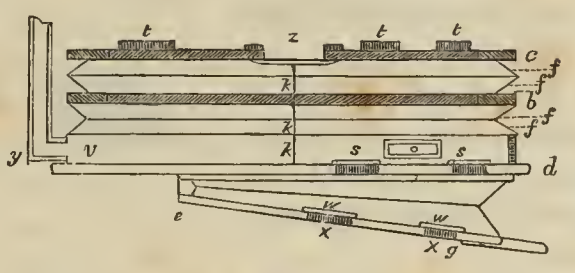

48. The *ribs* are the variously shaped pieces of wood that form, chiefly, the folds of the bellows. They measure about 3-8ths or half an inch in thickness, or perhaps rather more when the ribs are broad or very long.

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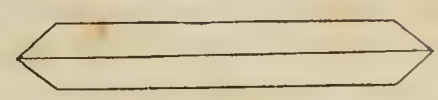

49. Two general forms of rib are made use of—the *parallel* and the *triangular*. The former kind, represented in figures 24 and 25, is employed in the formation of the reservoir of the bellows, and the spreading end of the feeder (*fig.* 17); the latter (*fig.* 26), for the sides of the feeder. Those constituting the sides and ends of the reservoir are nar-

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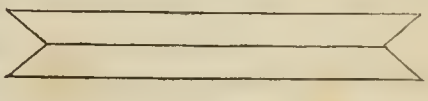

row and long, measuring usually three or four inches in breadth, and from three or four to ten or twelve feet in length, or even more, according to circumstances.

50. The *parallel ribs* are classified into *direct* and *inverted*, in regard to a certain peculiarity in their shape. The former kind are those which have their *shorter* sides hinged together: the latter, those which have their *longer* sides so united. The direct ribs (25) are used in the formation of the *lower* half of the reservoir: the inverted (24), for the *upper* half—at least, in modern bellows. In addition to this classification, the parallel ribs are further divided into *side-ribs* and *end-ribs*, in reference to the position which they occupy.

51. The *triangular-shaped ribs* are made broadest at the end where the feeder opens widest (*o*, *fig.* 26; also *a*, *fig.* 16, and *fig.* 23); from whence they gradually diminish in width towards the other end, finishing off in a point. In the formation of the reservoir of a horizontal bellows, sixteen ribs are used; four on each side, and as many at each end. These ribs are divided all round into two series of two each, by a frame called the *middle-frame;* of which, however, only the edges are to be traced in a completed bellows. (*b*, *figs.* 16 and 23.)

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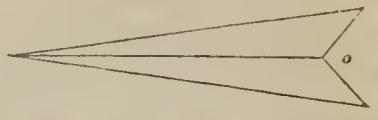

52. The *valves* in the middle and bottom boards are formed of one, two, or three thicknesses of leather, glued together. They are made rather larger than the openings which they are designed to cover, that the closing may be effectual. (See figures 27 and 28 for the plan and section of the valves.) The valves are usually hinged on at one end (*b*) to the "board," the other end and both sides being left quite free to rise and fall. The end forming the hinge consists of one thickness only of leather (*figs.* 27 and 28), that it may be perfectly flexible. Occasionally the valves are attached with pieces of tape; one piece at each of the four corners, with the other ends nailed to the board. The entire valve then rises; the pieces of tape preventing its shifting from over the orifices or gratings.

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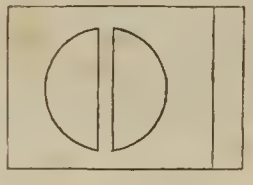
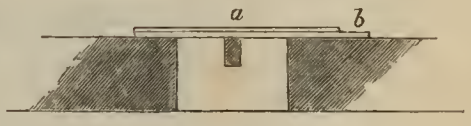




28

53. These several openings or gratings are technically called *suckers*. They are sometimes made of an oblong form; as shown at *f f f*, in *fig.* 21, and at *w w*, in *fig.* 23, and filled in with a metal or wooden grating; or they consist of clusters of circular holes; as shown at *f f*, in *fig.* 22, and, on an enlarged scale, in *figs.* 27 and 28. The gratings in the square suckers, and the wooden substance that separates the holes of each circular cluster from one another, prevent the compressed air from forcing the valves downwards through the suckers.

54. As their names imply, the bottom-board forms the bottom to the feeder; the middle-board occupies the intermediate position, and so serves the double purpose of roof to the feeder and bottom to the reservoir; while the top-board forms the top to the reservoir.

55. Of these three great layers of wood-work, the middle-board is the fixture,

and supports the entire bellows. Below hangs the feeder, and above rests the reservoir. The bottom and middle-boards are furnished with perforations or gratings, with leather valves lying over the upper sides; the use of which will be the most clearly understood from an explanation of the manner in which a horizontal bellows is worked.

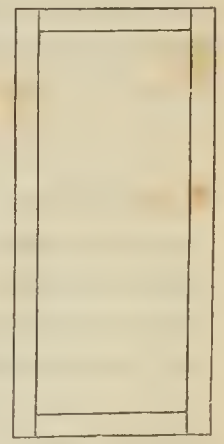
The working of the horizontal bellows; and the room which the compressed air makes for itself between the plates and folds of the reservoir.

56. As the free end (*g*, *fig.* 23) of the feeder descends, the external air throws back the valves (*w w*) in the bottom-board, and rushes through the gratings (*x x*), filling the cavity of the feeder; after which the valves descend again over the gratings and close in the wind. The hanging end of the feeder is then drawn upwards, by which movement the enclosed air is strongly pressed against the surface above—that is, against the underside of the middle-board (*d*). The exercise of this force throws back the valves (*s s*) that lie over the apertures in the middle-board—the valves not being intended to resist the pressure of the wind in this direction, but only *downwards*,—and the wind having thus cleared a way for itself, passes from the feeder into the reservoir. The valves of the middle-board (*s s*) then in their turn fall over the openings and prevent the return of the wind into the feeder.

57. At the moment wind is being thus transmitted, the top-board (*c*) rises, and the folds (*f f f f*) extend so as to form a sufficiently capacious receptacle for it.

58. While the several processes just detailed are going on, some of the wind is, under the pressure of the surface weights (*t t t*), constantly flowing through the various exits or *wind-trunk holes* (*o* and *v*) into wooden tubes (*y*) or *wind-trunks*, and thence to the several departments of the organ supplied by that bellows; the top-board of the bellows descending and the folds collapsing as the quantity of the wind in the reservoir is reduced, and rising again and the sides expanding as more wind is supplied. In *figs.* 16, 23, 34, and also in the general section, the reservoir is represented as being fully distended or charged with wind; and in *fig.* 32 it is shown in a collapsed or resting state.

29



59. The folds of the bellows are subject to a constant strain in consequence of the antagonistic powers exercised by the feeder on the one hand, and the compressing weights on the other; the former forcing air upwards, while the latter press the top-board downwards.

60. To give them the power of resisting the outward pressure of the contained air, arising from these circumstances, a piece of frame-work of about three-quarters of an inch in thickness, some three or four inches in breadth, and of nearly the same outer measurement as the top-board (see *fig.* 29) is inserted between the two series of ribs.

61. This *middle-frame* holds the ribs so firmly in their proper positions, that there is no liability of the folds bulging from the force above alluded to.

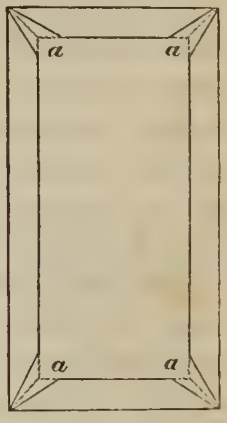
The construction of the reservoir.

62. The several parts of the reservoir already described are worked together in the following manner. The ribs are first assorted into pairs; the proper sides of each couple being brought close together. A long strip of white-dressed leather is then glued over the contiguous edges; a second piece being attached in a similar manner to the same edges on the other side. These pieces together form a strong hinge, which is called the middle-joint.

63. All the other couples of the ribs are then firmly united together in like manner.

64. The lower edge of the under series of ribs is then fastened to the lining: secondly, the upper edge of the upper ribs is united to the edges of the top-board: thirdly, the lower edge of the upper series is bound to the inner edge of the middle-frame; and, fourthly, the upper edge of the lower series is joined to the outer edge of the middle-frame. The openings at the four angles or corners, where the ends of the ribs nearly meet, and marked *a a a a*, in *fig.* 30, are then closed with leather, which form what are technically called the *gussets*. The adjoining figure (No. 30) is a plan of the folds of the reservoir.

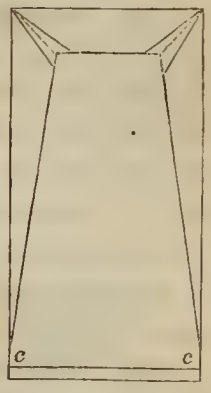
30



The construction of the feeder.

65. The folds and boards of the feeder are joined together in much the same manner, only that the end of the bottom-board is strongly fastened to the middle-board with several pieces of shoe-leather, rope, girth-webbing, or something of the sort, to form the working part of the great hinge. Over these is glued a stout coating of white leather, to render this joint equally air-tight with the others. A piece of wood running across the end of the feeder (*c c*, *fig.* 31), and about equal in thickness to the folds when they are closed against the middle-board, admits of the feeder being drawn up without straining the hinge. Both corners, where the end of this cross-piece and the points of the side-ribs nearly meet, are covered in with leather *corner-pieces*. The adjoining figure (No. 31) is a plan of the folds of a single feeder, which are formed of six ribs, two to form each side, and two for the hanging end.

31



The blowing-action.

66. The apparatus by which the feeder of the bellows is put in motion, is called the *blowing-action*, one of the simplest kinds of which, namely that for a single feeder, consists of a vertical pump-rod, a horizontal bellows-handle, and an upright standard, to which must be added the fork-shaped piece of wood that projects from the hanging end of the feeder, called the *lug*. The lower end of the pump-rod (*a*, *fig.* 34) is placed between the two prongs of the lug (*w*) and secured by an iron bolt (*v*); the upper is placed in a *mortise* cut in the near end of the bellows-handle, and similarly secured, while the bellows-handle itself rests in a deep cutting made in the upper part of the standard to receive it, where also it is secured by a bolt. Where there are double feeders, there are of course also *two* pump-rods (*a a*), which then communicate with a large lever (*o o*),

from which latter a rod (*c*) communicates with the bellows-handle (*d*). (See *fig.* 35.)

67. The disengaged end of the bellows-handle usually passes through a high and narrow cutting in the organ-case, and is worked outside. As, however, it is necessary that the bellows-blower should at all times know at what rate the wind in the reservoir is being consumed, which will at times be rapid, and at others slow, and as the bellows themselves are generally hidden from view, a kind of index, or, as it is commonly called, a *tell-tale*, is introduced to convey this necessary intelligence. This consists simply of a plummet fastened to a piece of whip-cord, which whip-cord is carried over a little wheel in the organ-case near to the bellows-handle, and then fastened to the top-board. As the reservoir fills and the top rises, the weight *descends;* as its contents are exhausted and the top descends, the weight *rises*. When the weight is down, the bellows are understood to be "full;" and when up, "empty." The most proper place to keep the weight is about midway between the two extremes.

An early defect, and its remedy.

68. The horizontal bellows was not always the efficient machine we now see it. Like its predecessor, it had at first many defects, which only subsequent improvements have removed. For instance, the two pairs of ribs with which the reservoir is furnished at the sides and ends, originally folded *the same way*, that is, inwards. The consequence was, a tendency to an inequality in the strength of the wind; one of the main causes being the same in this case as in that of the diagonal bellows, namely, the compressing influence of the inward-folding ribs. This fault, so fatal to the steady articulation of the pipes, led to the action of the upper series of ribs being *reversed*, by making which fold *outwards* while the lower continued to do so *inwards;* the former gave *more* space to the wind as they closed, just in proportion as the latter gave *less*. Thus any disadvantageous influence exercised by the one set was neutralised by the action of the other. These circumstances led to the upper series being called "inverted" or "compensating" ribs. This important improvement was effected by Cummins, a clock-maker by trade, who, however, did but little with its discovery; and the merit of introducing it more publicly, and in proportion to its merits, is due to the late Mr. Flight.

The counter-balances.

69. One condition, however, necessary towards securing the corrective influence of the direct and inverted ribs, was, that both sets should always be at the same *relative* degree of openness and closeness; for otherwise an unequal wind would still result. To obtain this proportionate action, some light, moving, directing frame-work (*fig.* 16, *w w*) was applied to the two sides (or sometimes to the two ends) of the reservoir, and attached to the trunk-band (*g*), middle-frame (*h*), and top-board (*c*) of the reservoir, which "guide-work" always kept those three portions at equal distances apart, and so effectually secured the required and exact contrary action of the two series of ribs which occurred in the spaces between them. The *counter-balances*, as the adjuncts in question were called, served the additional purpose of preventing the top-board, with its heavy weights, swerving to the right or to the left, instead of rising and falling. In large bellows the influence of ribs is far less than in small ones, as the width of the ribs is by no means increased in propor-

tion to the superficial measurement of the bellows. The ribs, therefore, of large bellows are narrower in proportion than in small ones, and their influence consequently less perceptible.

The waste-pallet.

70. Another cause of inequality in the wind first existed. The consumption of wind would, under certain circumstances, be very slow and gradual; the rate of the fresh supply from the feeder being then, most probably, much greater than that of the outflowing. This additional wind, accumulating in the reservoir, would soon fully distend it. If, while in this inflated state, more wind were attempted to be introduced, as the reservoir could expand no farther, the extra wind could only make room for itself by compressing that which was already within into a still smaller space. By doing this, the density of the organ-wind would be increased beyond the required degree. Besides causing the pipes to produce a shrill scream rather than a musical sound, the soundness of the reservoir itself would be endangered by the consequent over-tension, and the leather hinges liable to be strained or even rent by the violence. To obviate such evils, a clever contrivance, called the *waste-pallet*, was devised. This, in its earliest form, much resembled the key of a wind instrument on an enlarged scale, and consisted of a plate covering a vent, with a lever (or tail) working on a centre, by which the plate could be raised. This pallet occupied the centre of the top-board, and was so disposed that when the top-board had risen to a certain and its proper height, the tail of the waste-pallet came in contact with some wood-work. If more wind were now passed into the reservoir—the retention of which would involve a farther distension of the reservoir, and consequently a farther rising of the top-board,—the tail of the pallet struck against this wood work; the other end was lifted up, the vent uncovered, and the extra wind thus allowed to escape. A spring, placed either above the pallet or under the tail, kept the pallet closed, except when purposely opened.

71. With a view to the saving of room, and other circumstances, the waste-pallet was, after a time, transferred from the upper to the underside of the opening, as shown in *fig.* 23, *z*, also at *a* and *d* in *figs.* 19 and 20, and there hinged on at one end to the top-board. It was, therefore, changed in plan from the key to the valve kind. The waste-pallet was now worked by a piece of rope (*fig.* 23, *k k k*) or a leathern thong, one end of which was fastened to the pallet, and the other to the middle-board. This rope or thong was just long enough to allow the top-board (*c*) to rise to the desired height, without checking the pallet, and no farther. If any more wind were now attempted to be introduced, the top-board would, indeed, rise somewhat higher, but the pallet would be held stationary by a rope, now stretched at full length; and the vent consequently being uncovered, the superfluous air would escape.

72. In modern bellows, the waste-pallet is often situated in the middle-board, to which part it was removed, because dust or *cuttings* sometimes worked their way on to the edges of the pallet and prevented its closing properly. When so placed, it consists simply of a reversion of that just described. The vent is cut in the middle-board; the pallet is laid over it, and raised by a rope fastened to the top-board, which latter, after rising to a certain extent, draws it up, allowing the wind to escape underneath, outside the feeder. Some organ bellows have two waste-pallets, one opening into each feeder. In this case, as superfluous wind is introduced by one feeder, an equal amount is discharged into the other.

73. But whatever may be its situation, the waste-pallet is always introduced to serve the same end, in regard to the reservoir of a bellows, that a safety-valve does to the boiler of a steam-engine; namely, to guard it from more than the intended strain, by letting off all that might otherwise peril its soundness.

74. The above are the most important improvements for equalising the wind made in the horizontal bellows up to within the last thirty years.

The unsteadines of the organ-wind arising from unskilful blowing, or from irregular consumption.

75. There were other ways, however, in which the strength of the organ-wind might be disturbed, besides those arising from the irregular compression of the weights and ribs of the reservoir, and ways which were beyond the power of the devices just enumerated to correct. For instance, if, instead of the bellows-handle being pressed down gradually—as it always should be,—it were thrust down with a jerk, the wind in the feeder would be forced into the reservoir so suddenly that there would not be time for the top and sides to rise and unfold to receive it; the result for the moment being an over-compression of the wind.

76. Whether the modifications made on the original kind of feeder were introduced partly with the object of lessening this evil, does not clearly appear. At any rate, as some bellows have one description of feeder, and others another, it will be necessary to give a brief notice of the several kinds in common use.

77. The feeder, as originally made (see *figs.* 16 and 23), gave its entire and copious supply of wind all at once with the single down-stroke of the handle. This supply was afterwards divided, and transmitted more gradually and continuously by means of a feeder made on the principle of the little bellows of the common cuckoo toy, and hence called the *cuckoo feeder*. In this feeder, the bottom-board, instead of being fastened to the middle-board at one end, as in the instance of the *single feeder*, was hung about midway between the two ends to a cross-board running transversely beneath the middle-board (see *e e*, *fig.* 32, which presents a side view of a bellows

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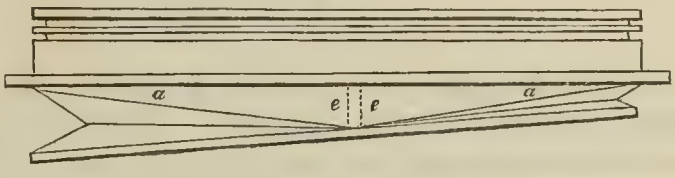
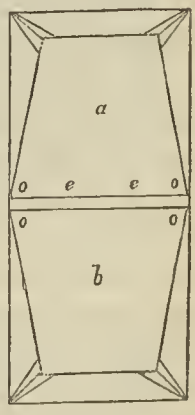

with a cuckoo feeder). Each half was provided with two end-ribs and four side-ribs, the latter with their points (*o o o o*, *fig.* 33) towards the cross-board. These several parts were fastened together in the usual way, and, with the addition of an *underlining*, of the same depth in the centre as the cross-board, but inclining upwards towards each end (*a a*, *fig.* 32), formed two separate though smaller feeders. On referring to *fig.* 32, the two feeders will be distinctly traced.

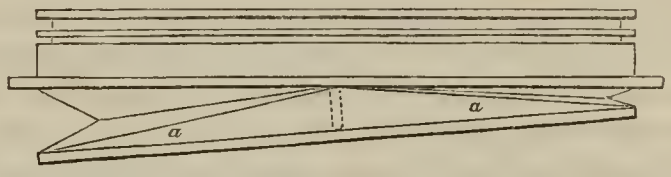
33



78. A cuckoo feeder gives a supply of wind with the upstroke of the bellows-handle as well as with the down, which was not the case with the single feeder; and the quantity of wind pumped in by the two strokes is about equivalent to that supplied by the one stroke from the older kind of feeder.

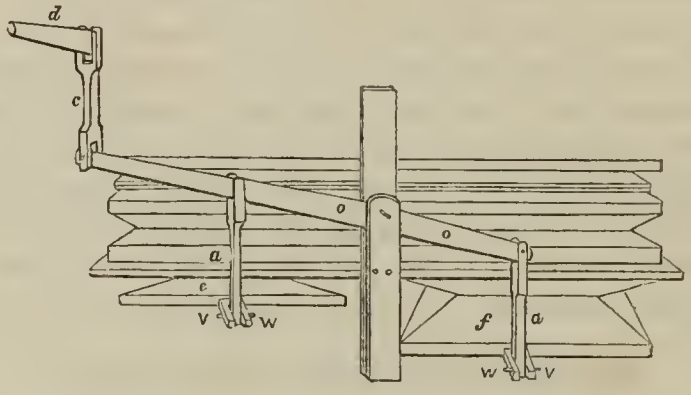
79. In some cuckoo feeders, the under-lining (*a a, fig.* 32) is transferred from the under-side of the middle-board to the upper side of the bottom-board, and *reversed*, as shown at *a a*, in *fig.* 34. This has the effect of greatly strengthening the feeder, the bottom-board of which is subjected to a considerable strain across the middle, where there is consequently a possibility of its "springing," but which tendency is entirely removed by placing the lining as shown in the figure below. This transfer of the under-lining does not weaken the middle-board, which is amply strengthened by the trunk-band and the inside bracings.

34



80. A third kind, called the *double* feeder, differs from the cuckoo feeder, in having a separate bottom-board to each feeder, instead of one long board to serve for the two. Feeders of this class are not simply "separate" feeders, as in the cuckoo, but are also "independent" feeders (*e f, fig.* 35), like those of the single species.

35



They usually extend the cross-way of the reservoir, as shown in the accompanying engraving; though occasionally they run lengthways. Double feeders present this advantage; if one becomes unsound, the other still can be used while the repair of the first is being proceeded with, which could not be the case with the cuckoo feeder. The several kinds of feeder, however, have all a tendency to excite an occasional unsteadiness in the supply of wind, if operated upon by an unskilful blower.

81. But there were discovered other causes of unsteadiness in the wind. The wind became agitated—as indicated by the altered speech of the pipes—when many bass keys (the pipes of which consumed a great quantity of wind) were pressed down simultaneously; and a similar effect was also noticed on their being suddenly allowed to rise. The disturbing cause in the former case originated with the large pipes, which consumed so much of the wind in the wind-chest, that what remained expanded by its own elasticity. Having thus lost some of its intensity or strength, the smaller pipes of the keys higher up in the scale supplied by it would in consequence speak with a kind of hesitation, which would continue till the flow of wind from the bellows had been accelerated in proportion to the increased demand, and the general mass had thus regained its accustomed power.

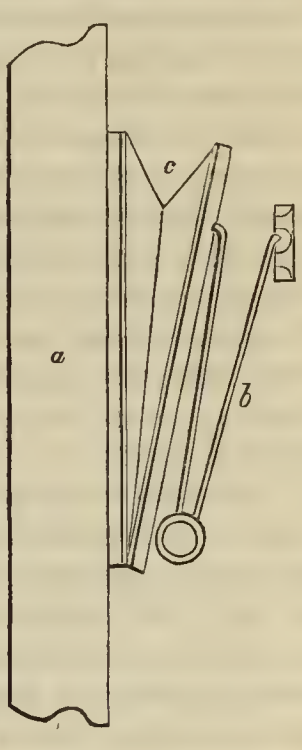
82. The agitation in the second case arose from the wind continuing to flow in the same rapid and copious manner into the wind-chest for an instant after the great demand for it had ceased. The wind there, meeting with a check, accumulated, causing an over-compression; and, by its thus acquiring greater force for the moment, brought about the defect the other way.

83. Some apparatus, therefore, was required, possessing the power of adding a small quantity of wind to the usual supply, when that supply, from extraordinary circumstances, would be scarcely sufficient, and of deducting some, when, from opposite causes, it would be too great and too strong. Such a wind-regulating apparatus Mr. Bishop devised, whose invention is now so generally known as the *concussion-bellows*.

The concussion-bellows.

84. This apparatus for steadying the wind is usually formed of a board and six ribs (see *fig.* 36), like a single feeder; though occasionally it is composed of a board and eight ribs, resembling the top and lower ribs of a reservoir. These form a small wedge-shaped reservoir (see *fig.* 36), which is fixed around and over a hole cut through one side of the wind-trunk (*a*), or sometimes through the bottom of the wind-chest, with a metal spring behind (*b*), the strength of which is so adjusted as precisely to balance the ordinary pressure of the compressed wind. When the bellows are blown, the concussion-bellows immediately becomes partly charged from the wind-trunk, or wind-chest, to which it is attached; and, partly expanding, is then ready to operate either way. If any jerking now occurs at the bellows, or if the consumption of wind be suddenly reduced—either of which circumstances would cause a momentary over-compression of the wind,—the concussion-spring gives way, and the concussion-bellows opens further. More room being thus afforded to the wind, its density is reduced to the proper strength, and its extra force is in consequence removed, instead of being expended on the pipes that are speaking.

36



85. On the other hand, when a large and sudden demand is made on the wind, and the supply is likely to run short, the concussion-bellows, now acting in the opposite manner, collapses, as it always has a tendency to do under the influence of the spring when the wind-resistance from within decreases, and, returning so much of the wind previously contained as the exigency of the occasion requires, raises the strength of the organ-wind to its proper force.

86. When the organ is not being played upon, but the "wind is in," the concussion-bellows remains about halfway open.

The Anemometer.

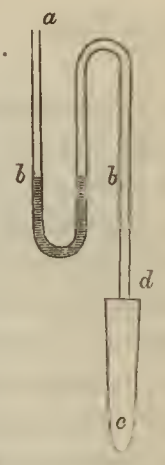
87. The organ-wind is required to enter the pipes with not less than a certain prefixed and uniform force. This required strength the bellows do not give to the wind unassistedly; hence slabs of iron or large lumps of stone are placed on the top of the bellows to compress the wind. Stones are, however, very unfitted for the purpose; for, in *damp* weather, they absorb a great deal of *moisture*

and *gain* weight; and in *hot* weather, the moisture again *dries out* and they *lose* weight; the organ, in consequence, continually changing both in tone and tune. Slabs of iron are best, although they are of course more costly. The exact amount of weight to be used depends partly on the size of the bellows, and partly on the "strength of wind" they are desired to produce.

88. The precise power of the blast from the bellows is ascertained by the aid of a little machine, called the *anemometer*, or wind-gauge; and the process is termed "weighing the wind."

89. The anemometer consists of a glass tube, bent in the manner represented in *fig.* 37, having the lower end (*d*) fixed into a socket, with the other (*a*) open to the atmosphere. When the wind-gauge is about to be used, a small quantity of water is poured in at the upper end, some of which passes through the bent part and finds its level on the other side (*b b*). The socket is then placed over one of the holes in the upper-board of the sound-board, through which one of the pipes is to receive its supply of wind; and the bellows are inflated. Under the influence of the surface-weights, the wind, on the opening of the pallet, rushes up to the sound-board with great force, and, entering the socket, traverses the glass tube till it reaches the surface of the water, which it depresses, raising that on the other side to a corresponding extent. At first, the water oscillates; but when it has ceased to do so, the deviation between the two surfaces is ascertained with a rule; and if it is found to be, say two and a half inches, the bellows are said to give a "two and a half inch wind."

37



90. If a "stronger" wind than this is required, more weights are gradually added to those on the surface of the bellows, till the index shows the desired difference by a still further rising and falling of the water in the anemometer.

91. The "weight of wind," to which the manual portions of a church organ are usually "voiced," ranges from two and a half to three inches. The pedal stops, when supplied by a separate bellows, are usually voiced to a wind a quarter or half an inch stronger than the above, which accelerates the speech and improves the tone of the large pipes. The *amount* of surface-weight necessary to produce the compressed organ-wind, is about *three pounds and a quarter* per superficial foot of the top-board, to give an *inch* wind. This is the *average*, for the thickness of the top-board makes a little difference. In large bellows, with inch-and-a-half timber in the top-board, the weight will only be about *three pounds and two ounces;* while in small bellows, with only inch timber in the top-board, the weight required will be about *three pounds and six ounces;* the variation in the weight of the timber accounting for the difference. On a bellows, therefore, that produces a *three-inch* wind, the average amount of surface weight will be *nine pounds and three quarters* per superficial foot.

92. Some of the French builders use different weights of wind for even their manual stops, and without increasing the number of bellows. This they manage by placing two or three smaller reservoirs over that of the bellows, with expanding wind-trunks (like the sides of an accordion), reaching from the latter to the former. The upper reservoirs are then loaded with different proportionate amounts of surface weights, thus producing the varied pressures of wind.

DIVISION III.

THE WIND-DISTRIBUTING PORTIONS OF THE ORGAN.

CHAPTER III.

THE WIND-TRUNKS.

The wind-trunks.

93. THE wind, having been collected and compressed in the manner detailed in the preceding chapter, is next distributed among and conveyed to the several main divisions or departments, i. e. great, swell, pedal, &c. of the organ, through the medium of wooden tubes, called *wind-trunks*.

94. When organs were made with bellows of the diagonal species, only one wind-trunk, or chief canal, issued from the bellows, communicating with the great organ wind-chest; and from that one, those for the choir and "echo" branched out. Conjointly, however, with the introduction of the horizontal bellows, a more independent method of winding the several divisions of the organ was introduced; each wind-chest then having a separate wind-trunk devoted to it, proceeding directly from the bellows.

95. The original wind-trunks of many old organs were not large enough to allow the quantity of wind to pass that was necessary to supply modern demands. This circumstance, however, was not the result of any miscalculation on the part of those who made them, but arose solely from certain alterations in the general style of organ-playing which were introduced subsequently to their construction. The old system of English organ-playing was very "light" and "thin," as compared with the modern; that is to say, but few keys were held down at a time, seldom more than three or four. Moreover, old English organs seldom possessed the advantage of "double stops" (which would exhaust much wind), neither were there even pedals to draw down the lower keys of the manual, the *occasional* use of which, therefore, had to be made with the fingers. The old wind-trunks, consequently, must have been amply sufficient for all cotemporary purposes. But, as a "fuller" style of playing has since come into vogue, and the bass of, not simply one, but both or even all the manuals (if there be 3), are brought under the unrestricted use of the feet, the demand on the wind has been considerably augmented. Hence the insufficiency of most of the old trunks for modern purposes, and also of the necessity, in most "restorations," for new and larger wind-trunks—increased means for *distributing* the wind being of as much importance as increased means for *supplying* it by new horizontal bellows.

96. The size of a wind-trunk varies according to circumstances; i. e. according to the number and size of the stops to be supplied through it, the distance at which the sound-board on which they stand is placed from the bellows, and so forth; and, thus governed, it ranges from four or five to sixteen or eighteen inches in width; from

three to about six inches in depth; and from two or three to twelve or fifteen feet in length.

97. The course that a wind-trunk follows, in traversing an organ, is direct or circuitous, according to circumstances; but the organ-builder makes the route as short as possible, for the important reason, that the nearer the bellows and sound-boards are to each other, the more prompt and decided will be the speech of the pipes. The wind is apt to become weakened by a long passage,—to compensate for which, the wind-trunk has to be made larger, as well as longer, whereby a needless expense is incurred,—besides which, the wind becomes more susceptible of disturbance, from the greater elasticity of the then lengthened column.

98. As the bellows and the wind-chests are seldom, if ever, on the same level, the direction of the wind-trunks is changed after their advance from the bellows, and turned towards the particular wind-chest which each has to supply. They are, for this purpose, jointed in one or more places, and the contiguous parts glued and nailed together, either at right angles, or in such other relative positions as will direct the wind to its destination by the least circuitous route (*y*, *fig.* 23). To render these joints thoroughly air-tight and strong, they are covered with pieces of parchment, leather, or paper. Parchment or leather is best for the purpose, though the most costly: paper is very perishable, and therefore almost useless. Some organ-builders cover the whole wind-trunk, internally, with a thin coat of glue, to fill up the pores of the wood; and externally, as well as a great portion of the wood-work, including much of the wooden pipe-work, with a coat of colouring mixture, compounded of glue and red-ochre, called red-size. A more agreeable looking compound for the last-mentioned purpose is of a dark slate colour, on which ground the lettering of the pipes, in white capitals, stand out very distinctly.

CHAPTER IV,

THE WIND-CHEST.

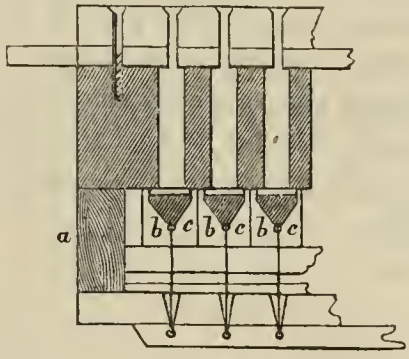
The wind-chest; its use.

99. THE wind thus conveyed from the bellows is received into what are called *wind-chests*. And now that the more minute distribution of the wind is about to be traced, it will be well, for the sake of perspicuity, to confine the remaining observations on this subject to a single division of the organ; more especially as the arrangements for the further distribution of the wind are the same in principle in every part of the organ; and, consequently, one description will serve for all its departments.

100. *A wind-chest* is a long and broad, but rather shallow, wooden case or box, a *cross* section of which is shown at *p p*, in *fig.* 39; and a front view at *c c*, in *fig.* 49. It is made of the same length as the *sound-board* above, to which it belongs; from half to two-thirds the breadth of the same; and about equal to it in depth, or perhaps a little deeper.

101. These general dimensions refer to modern work. The wind-chests of old organs, in some instances, measure little more than *one-fourth* the breadth of the sound-board, and are therefore, of course, far less efficient than the later examples, and for the reason before explained, when speaking of the smaller wind-trunks of old organs.

102. In the wind-chest the compressed air accumulates; and there it remains in a state of readiness for further and more minute distribution. A wind-chest, therefore, is in reality a *second* wind reservoir, locally disposed, and designed to receive a due portion of the great body of organ-wind collected in the *first* reservoir—viz. that of the bellows,—and to retain it for the supply of that special department or division of the organ to which the particular chest belongs.



Front view of a portion of a wind-chest.

Its attendant parts.

103. Through one of the *ends* (*a*, *fig.* 38), or sometimes through the *bottom* (*c c c*, *fig.* 39) of the wind-chest, the aperture is generally cut, at which the wind is to enter from the wind-trunk. The *back*, called the wind-bar (*d*), passes under all the sound-board-bars, crossways; and is made of very substantial material, because it serves a second purpose, namely, that of affording additional support to the sound-board above it, and so prevents the sound-board yielding under the weight of the superincumbent pipe-work.

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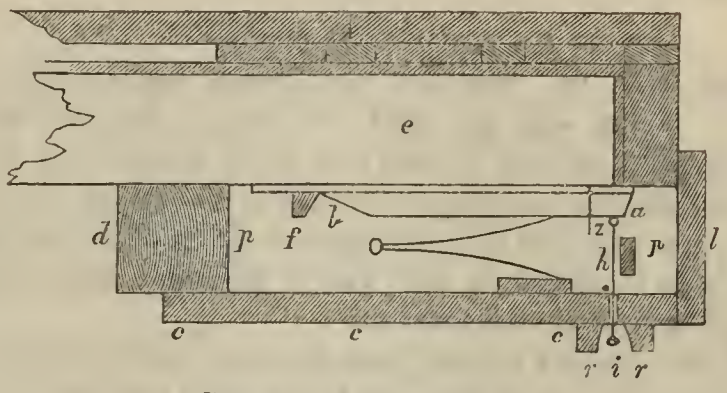

Side view of a wind-chest.

104. The ends, bottom, and back of the wind-chest are all firmly wrought together, and to the sound-board, which forms the *top* thereto. The *front-board* (*l*, *fig.* 39), as the front is called, is made moveable, because the *sound-board pallets* (*a*, *fig*, 39), and (*c c c*, *fig.* 38), are immediately inside, and they are liable to temporary derangement from a variety of causes, and are therefore required to be easy of access. The front-board, then, is simply fastened on with screws (see *fig.* 67, *e e e*), so that it may be soon removed, if the pallets require cleaning or repairing.

105. Immediately under each pallet a hole is drilled in the bottom of the wind-chest, through which the necessary communication is established between the sound-board pallets inside the wind-chest and the *key-movement* without. These holes, which are ranged in a line, are made much larger than the thickness of the pieces of wire that pass through would require (see *figs.* 38 and 39), for that in wet seasons wood-work is very apt to swell; and the holes, if originally made so as nearly to fit, might, from their being, through this cause, smaller, prevent the pull-downs from passing freely, and so produce a "sticking." To prevent, however, an escape of wind through these enlarged holes, a long, narrow plate of brass is fixed over, or rather under, them—for it is outside the wind-chest;—and, through this, plate holes are drilled just sufficiently large to allow of the *pull-downs* working through them freely. The plate of brass is securely fastened on, by its edges being covered over with a small wooden beading (*r r*, *fig.* 39), which, at the same time, guards the loops (*i*) of the pull-downs from injury.

CHAPTER V.

THE SOUND-BOARD.

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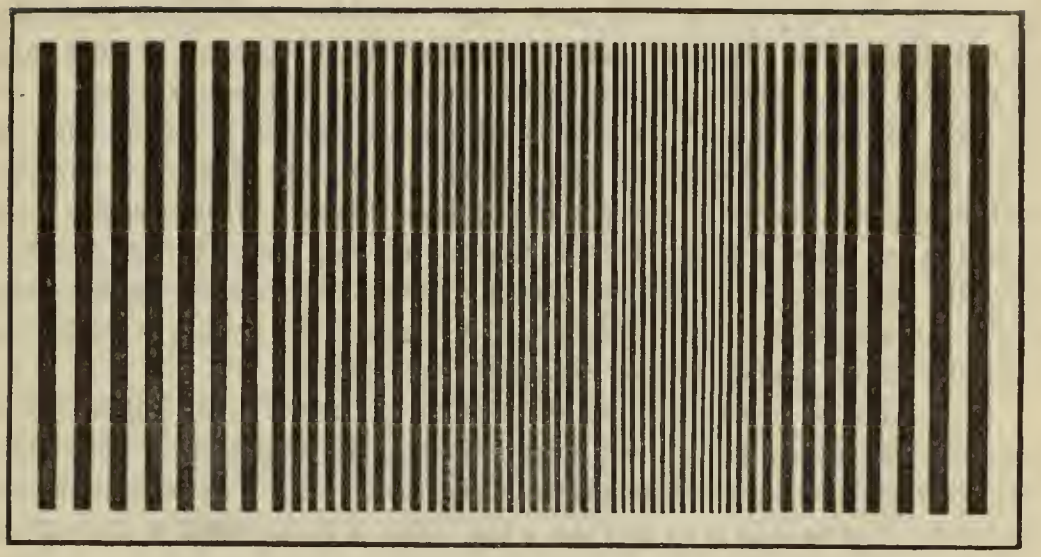

106. THE air that enters the wind-chest, in the manner already described, forms a sort of reserve, from which the several pipes of each key on the corresponding clavier receive their supply of wind. The ingenious arrangements and contrivances by which some of the wind is conducted from the chest to the pipes of any one of such keys, independently and exclusively of those belonging to the rest, next demand attention.

107. For every key on the clavier, a small special channel is usually provided; so that if there be, say 54 keys on a manual, there will be the same number of *grooves* (as they are called) prepared to conduct wind to their respective pipes. This is the general rule, to which, however, there are a few exceptions, which it is necessary to point out.

108. Some manuals, of which the *keys* extend throughout, are entirely without sound-board and pipes of their own, to the 8-feet octave (as is the case with all "tenor c swells"), and which, therefore, would produce no sound at all below that key, were it not that the bass octave usually communicates with the corresponding twelve semitones on the choir or great organ, or even with the "pedal pipes." Again, some pedal organs, and more particularly "pedal pipes," after extending through about an octave of their scale, suddenly turn back or repeat on the remaining pedals. In all such examples, the number of grooves in their sound-boards will be *less* than the number of the keys.

109. On the other hand, where the pipes to a key are numerous and large, as is frequently the case in the bass of great manual organs, one groove is not always sufficient to ensure a satisfactory supply to the whole; and *two* grooves are accordingly devoted to each key in the "great octave." Here, therefore, the number of grooves would *exceed* that of the keys. John England is said to have been the first English organ-builder who introduced "double grooves" for the bass keys of the great organ sound-board.

The formation of a sound-board.

110. The manner in which the grooves are formed is as follows:—A large and strong layer of wood, that is ultimately to form the roof of the grooves, is turned upside down, so as to bring the under surface uppermost. Several pieces of wood, called *sound-board-bars*, having been previously cut and planed to the requisite degrees of thickness, one of them is well glued on to the so-called *table*. To this are attached two pieces of wood, called the *fillings-in*,—one piece at each end,—of the exact width that the space or groove is to be; to which again is fastened a second bar; and so on, a bar and fillings-in alternately, until the required number of channels or grooves are formed. Next, a shallow piece of wood, a few inches in length, is let a little way into each groove, to form a hold, to which the tail-pieces of the pallets, presently to be noticed, can be attached; and similar pieces are also let in, in other places, to increase the amount of surface, to which the sheet of leather, forming the bottom, can be glued.

111. After the sound-board has been "glued up," as the process just detailed is sometimes designated, its two long sides, presenting the rough ends of the sound-board-bars and the intermediate fillings-in, are planed down; and a stout piece of mahogany, from an inch to an inch and a half thick, is firmly glued and pinned on over them, to secure the bars, to strengthen the sound-board, and to give it a neat and finished appearance. These front and back surfaces are called the *cheeks* of the sound-board.

112. A large sheet of leather is then glued over the whole under surface of the sound-board, except in that part of the grooves which is to be enclosed within the wind-chest, where openings are left as entrances for the wind. The sheet of leather (in old sound-boards, parchment) usually forms the only closing the greater portion of the grooves have underneath.

113. The *sound-boards* of old organs are generally of the *frame* kind; that is to say, the bars are at each end let into a frame, about one inch and a half thick, instead of being separated by fillings-in; and the grooves are closed in above with wood, there then being no separate table; after which, a sheet of leather is glued over the whole, on which latter the sliders work. In Germany and France, the sound-boards are still generally made in this way; and Mr. Bishop retains the custom of making the sliders run on leather.

114. The grooves run parallel to one another, as represented in *fig.* 40. When the sound-board is turned right side upwards, about half of the underside of every groove lies immediately over the wind-chest, as shown in *fig.* 39; the long openings already referred to being enclosed therein.

115. If all these wind-entrances were to be left open, air would pass through all alike into the pipes, and thus cause every note in the scale to sound at once. To

prevent this, the wind-entrances are first of all closed beneath by moveable pieces of wood, which are so adjusted that any one of them can be drawn open at pleasure, and wind admitted into the corresponding groove. By these means the power is admirably secured of admitting wind to, or of excluding it from, the pipes of any of the keys. These pieces of wood are called *sound-board-pallets;* and from them the openings which they cover are named *pallet-holes.*

116. To ensure the pallets closing firmly against and over the pallet-holes, a spring of brass or steel wire is inserted underneath each, which presses them upwards. See *fig.* 39. The springs in question are, in old sound-boards, generally made of brass wire, with two or three curls; in modern examples, they are frequently of steel wire.

How the sound-board-pallets are brought under control.

117. The orderly arrangement of the sound-board-pallets, side by side, in a row, will be found illustrated in *figs.* 38, *c c c*, and 49, *c c c.* As an organ cannot be played without some of the sound-board-pallets being drawn open, and as the pallets themselves are completely shut up in the wind-chest, means are taken for bringing them under *outward* control.

118. A small loop of wire *(fig.* 39, *z)* is inserted into the moving end of the pallet *(a)*, called the *pallet-eye;* to this is attached a piece of steel wire *(h)*, of sufficient length to pass through one of the holes *(o)* bored through the bottom of the wind-chest; outside which it is finished off in a loop *(i).* Every pallet is similarly provided with a *pull-down*, as this piece of wire is called (see *fig.* 49); and thus the first step is taken towards making the pallets answer to the touch on the keys. To ensure their keeping their proper course, each pallet is furnished with two other pieces of wire, one placed on each side, called *direction-pins (fig.* 38, *b b b;* see also *fig.* 49); which prevent the pallet turning during its opening and closing, and thus secure its closing truly and entirely over the pallet-hole. Some of the above features may now be noticed somewhat more in detail.

The sound-board bars.

119. The *bars* of a sound-board are all made of the same pre-arranged *length* and *depth;* but there is a considerable variation in their *thickness.* This is because they have a *second* office to perform; for, besides separating the grooves, they have to sustain and resist the pressure of the pipe-work above. As, however, the pipes belonging to the treble portion of a manual sound-board are all comparatively small and light, narrow bars afford sufficient support for them, and are therefore employed; whereas in the bass, where the pipes are both larger and heavier, bars of greater substance are necessary to ensure stability, and are consequently introduced. For the intermediate bars, two or three graduated thicknesses are adopted, according to their situation.

120. In addition to the variation in the substance of the bars in the *same* sound-board, the thickness and indeed all the proportions of sound-board-bars vary much, according to the number and size of the stops that have to be supported. Thus, the thickness of the bars ranges from one-third of an inch to an inch and a half; their length, from about two to five or six feet; and their depth, from two and a half to five inches.

121. Among the narrow bars of a sound-board, a stout bar is interspersed here and there, in order to give additional strength to the work, and to offer a good hold to the screws that fasten down the upper-boards. Two pieces of wood of extra

stoutness, resembling sound-board-bars in all other respects except their greater substance, form the extreme ends—also introduced to ensure stability—called the *end-bars*. The entire sound-board rests on a stout and substantial frame.

122. The sound-board bars are represented in *fig.* 38, by the *white* lines.

The sound-board grooves.

123. The *grooves* in a sound-board, like the bars, are frequently made of three or four different widths. The narrow ones are of course for the treble keys, and the broad ones for the bass, where the pipes are large and a plentiful supply of wind is demanded. In all other respects the dimensions of the grooves are the same throughout a sound-board; an increase in their width alone being ordinarily sufficient to secure an adequate supply of wind to *the same* stops in the lower part of the scale or gamut. When, however, this increase is likely not to prove so, the groove is not further enlarged, but a second one is allotted to the same bass key, as already explained. For *more* stops, the grooves are made *longer*, to allow the additional pipes standing and speaking room above; and also *broader* and *deeper*, that the cubic space in each groove may be adequate to the reception of the increased quantity of wind now necessary to feed the augmented number of stops. When these conditions, or any one of them, are not sufficiently attended to, the pipes do not all get enough wind to make them speak properly, and they are then said to "rob" each other.

124. It will be seen then, that there are no fixed dimensions for sound-board grooves, but that they vary according to the number and size of the stops. The extent of this variation is ordinarily from one-third of an inch to about an inch and a half in breadth; from two to about five or six feet in length; and from two and a half to five inches in depth. In some instances, as in large pedal sound-boards, the grooves are sometimes made as much as four inches in width.

125. The grooves are represented in *fig.* 38, by the *dark* lines.

The sound-board pallets.

126. The *sound-board pallets* are so many long and narrow pieces of wood, of a triangular shape (see *fig.* 38, *c c c*). One of the three flat surfaces is laid against the *pallet-hole*, to cover it and exclude the air from the groove. And, that the closing may be the more effectual, the surface so placed is coated with two or three thicknesses of white dressed leather (sheep-skin), which allow the pallet to "bed" more closely against the pallet-hole than the bare wood could possibly do. Besides assisting in completely excluding the wind, the leather silences the return of the pallet against the sound-board; which takes place with rather a smart blow, under the combined influence of the metal spring and the compressed air in the wind-chest.

127. The second and third surfaces of the pallet, constituting the sides, slope off gradually downwards, and ultimately meet and terminate in a long edge. This edge, pointing downwards and presented to the wind, enables the pallet, by its sharpness, to cut its way through the compressed air with comparatively little difficulty.

128. The ends of the pallet (*a b, fig.* 39), as well as the sides (*c c c, fig.* 38), are bevelled off, upwards; that forming the front (nearest the front-board) somewhat acutely (*a, fig.* 39), and the other much more gradually (*b, fig.* 39). By the latter, the pallet is attached to the sound-board, by glueing a long and narrow piece of leather to the tail of the pallet, and to the under-side of the sound-board;

and, so that the pallet may not accidentally become detached, from damp, &c. a piece of wood, called the tail-piece, is nailed over the end of the leather that is glued to the sound-board, which secures it (*f*, *fig.* 39). By the front end the pallet is drawn down or "open."

129. Now, as the grooves are made gradually broader as the scale descends that they may hold the required quantity of wind, so are the pallet-holes made gradually longer that they may admit the increased quantity of wind, and consequently the pallets themselves are also made larger. The pallet-holes range from about five to twelve inches in length, according to circumstances. The pallets are always made rather larger than the holes they govern, that they may ledge firmly against the bars and woodwork all round, and so thoroughly exclude the wind. Thus a pallet to cover a hole an inch wide, is made an inch and a quarter in width. A two-fold object has here to be attained, namely, of allowing *sufficient* margin to the pallet for the purpose just mentioned, without unnecessarily increasing its *size*, and therefore its resistance and tendency to ciphering. The *less* the pallet projects beyond the pallet-hole all round, of course the *less space* will there be for the *lodgment* of "cuttings," or any other substance that might fall through the sound-board on to the pallet; and an eighth of an inch on *each side* is amply sufficient to render a pallet perfectly "sound," if it is quite "true" in all other respects.

130. Some pedal pallets are made as much as sixteen or eighteen inches in length, and from four to five inches broad. The resistance, however, which the wind offers to so large a surface moving through it being very great, several organ-builders have devised means for overcoming this difficulty.

131. Mr. Hill, some years since, invented a new pallet, which allows of the passage of a large quantity of compressed air, without making so great a demand on the muscular powers of the performer to set it into motion as did the old *clack-pallet*. This new kind, called the *box-pallet*, is formed like a small box (*a a*, *fig.* 41), the bottom of which is open, but furnished with a moveable covering. On pressing down a key, this covering is drawn sideways, and up by the side of the box, as shown in *fig.* 42; returning again under the influence of a spring at each end, when the pressure ceases. The circular motion enables it to escape the pressure of the wind during the opening; an edge only, instead of a broad surface, being all that is presented to it; and the calculation is, that it thus reduces the resistance to *one-fourth* of that presented by one on the old plan; and admits, at the same time, *double* the quantity of wind. The leathered faces of the valve-seat are so arranged (the centre of motion of the valve being slightly eccentric to the curvature of the valve-seat) that all the parts are thrown out of contact at the first moment of motion, consequently there is no friction of surfaces. A silver medal was, in 1841, awarded by the Society of Arts to Mr. Hill, for his ingenious invention.

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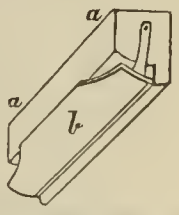

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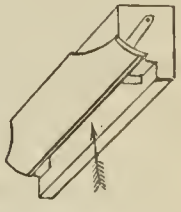

132. The *jointed-pallet* of Mr. Holt, of Bradford, consists of a pallet of the usual kind, with the front end (*a*, *fig.* 43) divided from the remainder, though jointed by means of the leathering above, so that the front may descend about the

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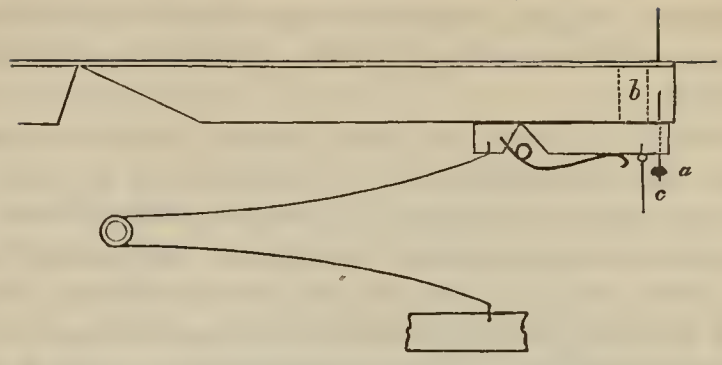

sixteenth of an inch before the hinder portion is set in motion. In a pallet fifteen inches long, about two inches and a quarter is thus separately hinged. The front part descends first, admitting air into the groove; after which the button *c* takes hold of the fork *d*, and by it draws down the remainder of the pallet without the finger having to overcome more than the resistance offered by the spring. The great organ pallets of the instrument in Leeds parish church have been altered agreeably to this plan, and the average resistance has been reduced from nineteen ounces to seven.

133. The *valve-pallet*, invented by Mr. Jardine of New York, and introduced by his nephew (of Manchester) into this country, is formed, as its name would imply, by attaching a second pallet, of diminutive size, to the back of the first one, covering a small circular orifice through the free end of the latter. See *b*, *fig.* 44, in which *c* represents a brass wire, tapped at both ends, screwed firmly

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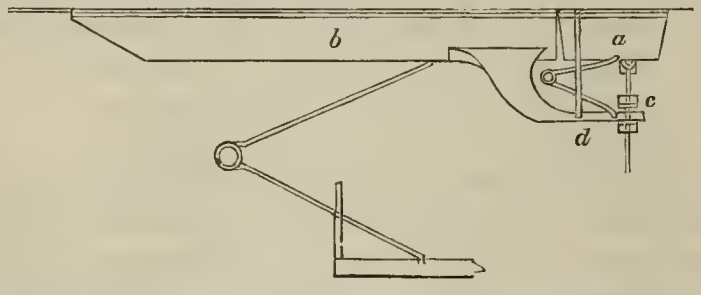


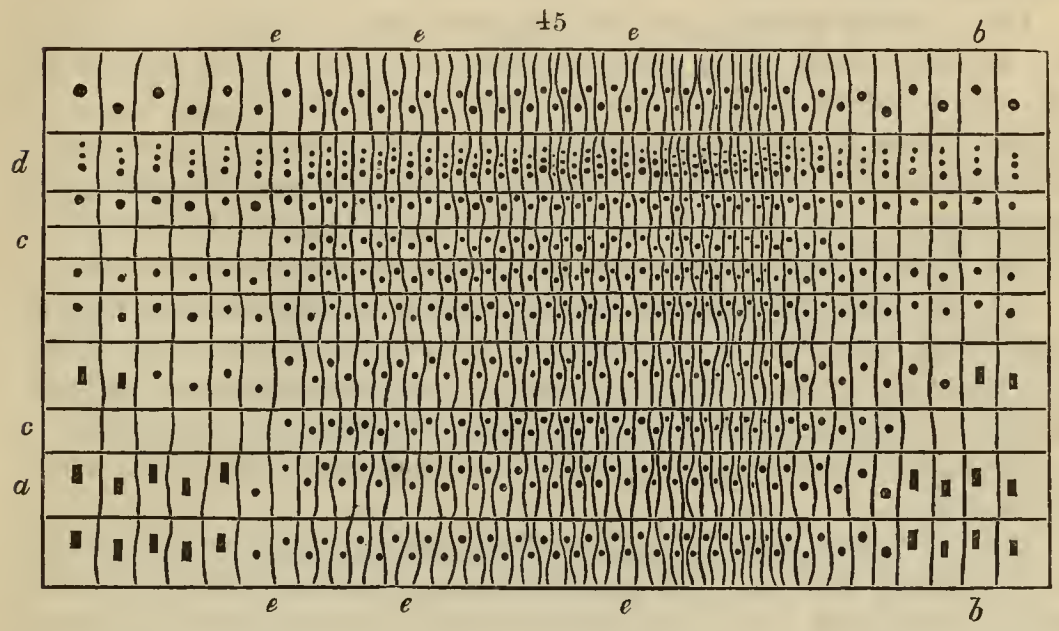
into the large pallet above, and furnished with a strong button (*a*) below; the middle part—passing through a hole in the small valve of sufficient size to allow the pallet to work freely—being left smooth, to prevent friction. On pressing down the controlling key, the small valve is lowered about the sixteenth of an inch, uncovering the orifice, and allowing some of the compressed air to pass through into the groove above. The atmospheric pressure now becoming the same over as well as under the pallet, there is only the resistance of the spring—necessary to ensure the *return* of the key-movement—to be overcome. The small valve, in descending, touches the button *a;* resting on which, it now draws down the large pallet with it. The jointed-pallet and the valve-pallet are obviously the same in principle, although the manner in which the ultimate object is attained in the two is totally dissimilar. There is no disagreeable "second" touch discernible in the action of either of the last-mentioned pallets.

134. Other kinds of pallet for lightening the touch have been invented by Walker, Willis, &c.

CHAPTER VI.

THE TABLE.

The table. 135. The grooves, as already described, are entirely closed or roofed in by a layer of stout and tough wood-work, called the *table*. Through



this table the wind has to make its exit. For this purpose, there are bored over each groove as many holes, or nearly so, as there are pipes to be supplied from each groove.

136. The accompanying engraving (*fig.* 45) represents the table of a sound-board thus perforated. On referring to it, and comparing it with the preceding illustration, showing the grooves of a sound-board, it will be at once seen that the rows of dots, circles, and squares, that may be traced by casting the eye in a line directly *across* the table, as from *b* to *b*, represent the several holes which occur in the roof of a *single* groove. And on turning to the general section that forms the frontispiece to this volume, the reader will there see represented the several pipes belonging to a single groove in each of the four sound-boards, drawn to a comparative scale.

137. But other series may be detected. For instance, if the eye be now directed *along* the table instead of *across* it, as from *a* to *a*, it will select from each of the transverse series, a single aperture, with certain deviations presently to be noticed. Each *longitudinal* series thus compounded constitutes the outlets for the wind from the grooves to the pipes of some single and independent *stop*. A portion of a longitudinal series will be found represented in *figs.* 49, 50, and 51.

138. Some of the longitudinal series in the foregoing illustration are so drawn as to illustrate certain peculiarities in either the arrangement of the perforations, their boring or grouping, which require to be explained.

139. In England, the room allowed for a church organ is seldom of sufficient

width to permit the pipes of the stops being arranged in a parallel and unbroken series. What is wanting therefore in width, has to be secured in the depth of the organ. Only every *alternate* pipe of a stop is therefore usually ranged in a straight line, the other pipes being planted at a short distance behind.

140. Now, as the holes in the table are bored in the first instance to suit the arrangement of the pipes, each longitudinal series has the *zig-zag* appearance shown in the drawing. Sometimes, when the pipes of a stop are very large, as is the case with those of the manual 8-feet posaune at the upper end, only every *third* pipe is placed in a straight line, thus necessitating a *three-fold* distribution of the corresponding series of holes.

141. In some instances, again, the longitudinal series of holes is not continued over the entire length of the table, as indicated at *c c c c*. This is generally the case when the stop to be placed above is not to be of the full compass, but *minus* the pipes to those grooves over which a blank is left, and consequently to those keys which govern them; and which, moreover, are not to be "grooved" into the bass of any other stop. Thus the blanks at *c c*, over the six wide grooves at each end of the table, indicate that the stop above will have no pipes to the bass or 8-feet octave.

142. In other cases, instead of there being simply *one* hole over each groove in a longitudinal series, there will be a cluster of from *two* to *five* smaller ones (*d d*) over every *treble* groove, and either the same number or an *oblong* one over each *bass* groove. These groups of little holes indicate the part of the table over which a *compound* or *mixture* stop is to be planted, and which always has from two to five pipes to a key.

143. The holes forming a longitudinal series are not made of a uniform size, but of graduated dimensions; the smaller holes being over the treble and the larger above the bass grooves. The latter are also sometimes made square instead of round, as shown at *a a*, in *fig.* 45. Neither are the several longitudinal series of holes bored of the same size, as all stops do not require the same amount of wind. For instance, a 4-feet stop consumes little more than half as much wind as one of 8 feet; while one of 16 feet requires nearly three times as much. The size of the holes in the table, therefore, obviously depends on that of the pipes and stop to be *fed* through those holes.

144. Sometimes a little air will escape through a groove-hole, and make its way up to some pipe, and cause it to produce a low, disagreeable, and continuous humming. This is called a "running;" to prevent which, little cuttings are made in the surface of the table, or in the upper-boards, in a zig-zag or waving course, passing between some of the holes, as shown at *e e e*, in *fig.* 45. If now any wind escapes, before it can reach the next pipe, it is caught in some one of these channels, and by it conducted to the edge of the sound-board, where it escapes through a small triangular hole, without doing any mischief.

145. A running is sometimes caused by a sound-board-bar "springing" (i. e. becoming partially separated) from the table; thus allowing a "leakage" of wind from one groove to the next. An accident of this kind can only be *thoroughly* cured by taking the wind-chest to pieces; but an expedient is in such cases often resorted to, technically called "bleeding," which consists in making a small hole in the groove through the "cheek," which allows the air to escape.

CHAPTER VII.

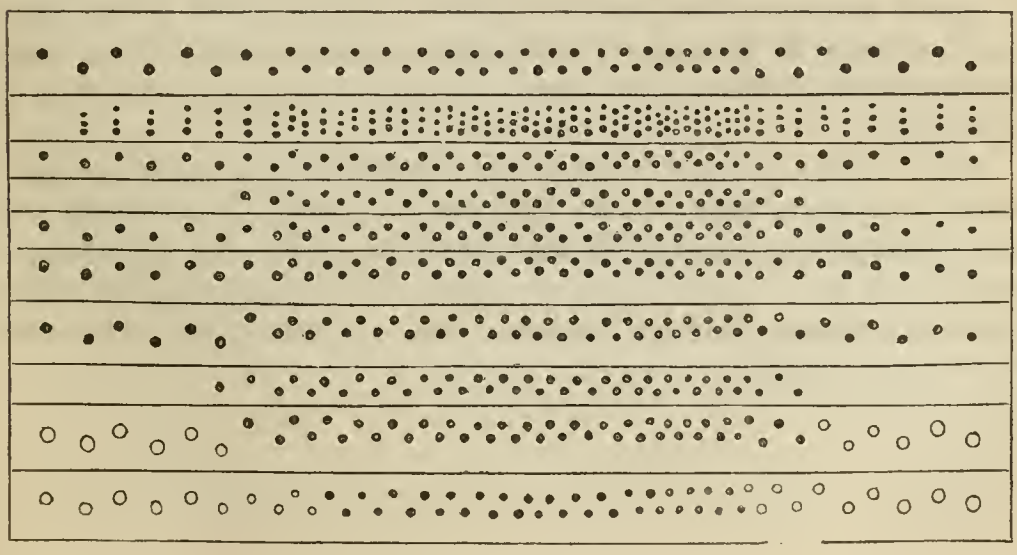
THE UPPER-BOARDS.

146. THE detection of the several transverse series of holes just now, will assist in illustrating the next particular to be noticed.

147. If the pipes belonging to the grooves were to rest on the table immediately over the series of holes just described, the wind, on entering any one of them, would pervade all the pipes of that groove, and the organ would in consequence be incessantly pealing forth its tones at their greatest power; none of the numerous modifications so necessary to accommodate the strength and character of the organ-tone to required purposes would be attainable; but all would be powerful, monotonous, and meaningless alike. Up to the beginning of the sixteenth century, all organs were nevertheless constructed after this fashion; but at about that period the stops or ranks of pipes began to be separated from one another. The power of subduing the organ-sound even to a mere whisper, if required, is now secured by the introduction of two additional layers of wood-work over the table, by means of which, the wind from the grooves can be excluded from or admitted to any or every longitudinal series of pipes at pleasure.

148. The upper layer of wood-work is, as nearly as possible, a counterpart of the table, and is placed at a distance of about one-third or half-an-inch from it. (See *fig.* 46.)

46.



Indeed, it may be said to be a repetition of that part of a sound-board, rendered necessary by the introduction of the mechanical work that is to control the speech of the pipes, and which must be over the air-tight grooves, yet under the pipes. The area of its surface is similar in all respects to that of the table; the holes also correspond, for the most part, both in number, situation, and arrangement. It is not, however, like the table, made in one connected piece, but in several pieces, much *narrower* than the sound-board, though of the same *length* (at least in England), and which, when laid side by side, present a plain surface, as shown in the above figure.

149. A sound-board is, in consequence, said to have, not one, but several upper-boards; and it is an advantage to have as many of these as possible; a separate upper-board for every stop, if practicable. The reason of this is, that if a slider below warps or "binds," it can only be effectually set right by being first removed, and then planed; and as, by way of preliminary thereto, the upper-board must be taken off, and of course the pipes above it disturbed, this can be done, if there be a separate upper-board to each slider, without displacing more pipes than those the disarranged slider governs: but if there are one or two other stops on the same upper-board, those stops must also be removed before the upper-board can be taken off.

150. A narrow upper-board is also less liable to "cast."

151. One exception to the general rule, that "the perforations in the upper-boards agree with those in the table," occurs in the case of "conveyanced-off pipes." When the sound-board, from whatever cause, is made so short that all the pipes cannot have proper standing and speaking room thereon, a situation has to be found for some of the larger pipes elsewhere, and the wind has to be conducted from over the holes in the sound-board to their new locality. If this situation be on nearly the same level with the sound-board, a groove is cut in the substance of a kind of second upper-board, called the *groove-board*, from over the former to the latter, and then the surface outlet is made; and when the pipe is below or above the level of the sound-board, a metal tube, called a *conveyance*, is introduced, to conduct the wind from the groove or the groove-board to the pipe.

152. It sometimes happens, particularly in modern churches, that the site for the organ is so circumscribed that there is neither adequate width for the sound-boards, nor height for the pipes. It is this latter circumstance that renders it necessary for the organ-builder to place some of the large pipes one or two feet below the sound-board.

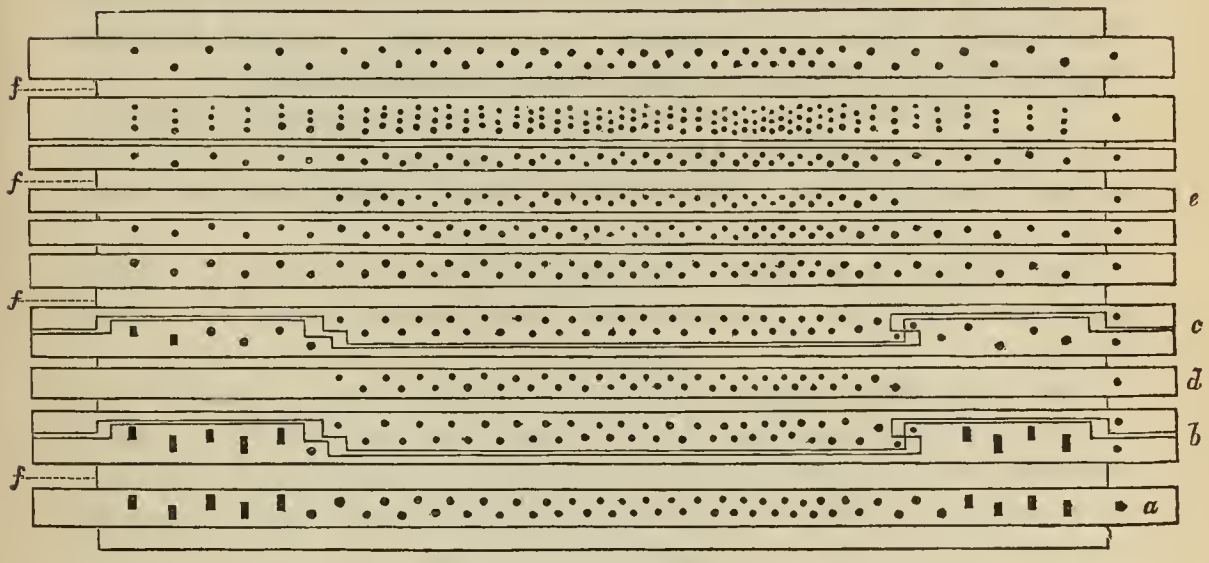
153. Another exception to the general rule sometimes occurs in the case of mixture or compound stops. In the bass part of the table, the preparation for a stop of this kind sometimes consists simply of one long hole. But as each key is provided with from two to five pipes, the upper board on which they rest is required to have an equivalent number of punctures, instead of a single hole, and so causes the deviation in question.

CHAPTER VIII.

THE SLIDERS, BEARERS, AND PIPE-RACKS.

154. BETWEEN the table and upper-boards (the first and third layers), is the second layer of wood-work. Certain portions or longitudinal strips of this layer, like those above and below it, are *fixtures;* while the intermediate parts are *moveable.* The fixed parts are called *bearers* (*f f f f*, *fig.* 47); and the moveable, from their being so, *sliders* (*a b c d e*). The latter are the wind-regulating features.

47.



155. The *sliders* are so many long and flat pieces of oak or mahogany, lying over the longitudinal series of holes in the table. Each of these sliders is pierced with holes corresponding precisely with those in that part of the table on which it rests, and with those in the upper-board above.

156. This may be seen by comparing the accompanying wood-cut (representing the sliders and intermediate bearers) with the preceding two cuts, illustrative of the table and upper-boards.

157. The relative position of the three layers of wood-work, between the grooves of the sound-board and the feet of the pipes, could not of course be shown in the preceding plans; but they are represented in the "front section of a portion of a sound-board," *fig.* 49, where they are marked *a d e*, and to which section the reader might here refer, as it will illustrate the following explanation of the manner in which a slider operates.

The action of a slider.

158. On drawing a slider (*a*) a little way out, its perforations are brought exactly *over* those in the table (*e*), and therefore immediately *under* those in the upper-board (*d*). The three series of apertures now agreeing, the air can pass up uninterruptedly from any groove into which it may be admitted, through all of them, into the pipe of the stop that stands immediately above; the pipe being thus made to sound. The grooves are, in *fig.* 49, represented by the *unshaded* vertical divisions.

159. On moving the slider back into its former position, the holes in it are brought over the sound-board bars, the *shaded* parts, and the blank substance of the slider substituted for the holes over the grooves. The wind now, instead of finding a free outlet as before, is checked by the intervening material of the slider, against which it strikes, and is reflected back again into the groove. The wind-passage between the first and third layers of wood-work being thus intercepted, and the communication for the wind from the grooves to the pipes of this particular stop consequently cut off, it becomes silent, and the stop is said to be "in."

160. Every separate slider, as a rule, controls a separate stop; so that any stop may be allowed to sound or not, according as the slider is "in" or "out."

161. In some sound-boards certain of the sliders are "cut," so that the portion which controls the bass part of the stop above can be drawn independently of the remaining part. The stop is then said to "draw in halves." In *fig.* 47, the sliders marked *b* and *c* are represented as being constructed in this manner.

162. Other sliders again, which do extend through the whole length of the sound-board, are not perforated, in some cases, in that part which lies over the bass grooves. (See *fig.* 47, *d e.*) Sliders that are thus only partially bored, are intended to control stops that are of inferior range to the manual.

163. When all the sliders are drawn, the organ peals forth its amplest tones; when all are in, no sound is heard, because the wind cannot reach any of the pipes.

164. The sliders measure from one and a half to three or four inches in breadth; from one-third to half-an-inch in thickness; and a few inches more in length than the sound-board itself. Two additional holes are cut through each slider; one in that portion which, in consequence of its greater length, projects beyond the sound-board (*a*, *fig.* 47); the other, in some other part that is convenient for the purpose. The former receives the end of the lever by which the slider is moved to and fro, on the drawing out or the pushing in of the controlling knob at the side of the manuals. The second hole receives a stout iron pin, which is fixed into the table, and allows the slider just sufficient motion to cover or uncover the holes in the table. If this motion were to exceed or to fall short of what is necessary, the holes in the table would, in either case, be partly shaded, thus cutting off a portion of the supply of wind from the pipes, and preventing their speaking with proper strength or in tune.

165. Other holes are sometimes cut through the opposite end of the slider. This is often the case when the "composition pedals" act directly on the sliders.

The bearers.

166. The *bearers* receive and support the edges of the upper-boards, which are screwed down to them, and sustain the weight of the

upper-boards and pipes above—hence their name. The sliders are thus relieved from all pressure, and left entirely free to work.

167. In modern sound-boards there is commonly a bearer between every slider and its neighbour; but in old sound-boards there is more frequently only one bearer between every two or three sliders. The modern plan is obviously the best, as one slider cannot, in moving, rub against another and disturb its position.

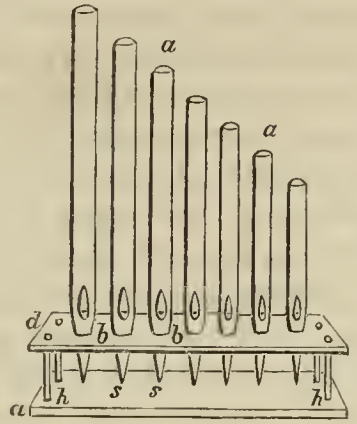
The pipe-racks.

168. The greater number of the pipes stand on the upper-boards, but cannot of course support themselves on their apex without more assistance: a frame-work, therefore, is used to keep them in an erect position.

169. The frame-work consists of some thin planks of wood, called *rack-boards* (*d*, *fig.* 48), laid parallel with, but four or five inches above, the upper boards (*a*), and is there sustained at all corners, and in other convenient situations, either by wooden pins, called *rack-pillars* (*fig.* 48, *h h*) or by some other connecting wood-work. These rack-boards are furnished with holes cut immediately over those in the upper-boards. Through these rack-board-holes the lower and narrow ends of the pipe-feet pass (*s s*), while the upper and broad ends of the pipe-feet (*b b*) are made to fit tightly into them; and to prevent the feet from shifting about, and the pipes getting out of the perpendicular, the "noses" (*s s*) of the pipes are sunk a little way into the upper-boards, which are "counter-sunk" to admit of this.

170. Most of the metal flue pipes, all the small and moderate-sized wood-pipes, and also the boots of the reed-pipes are racked in this manner.

48



CHAPTER IX.

THE ARRANGEMENT OF THE GROOVES AND STOPS.

The situation of the large and small grooves in the sound-board.

171. It has been explained how the grooves lie, side by side; and how some are broad, others narrow. Nothing, however, has yet been said concerning the *order* in which these broad and narrow grooves are arranged with regard to one another. In England, the grooves are seldom made to succeed each other after the manner of the keys—that is to say, semitonally,—but are generally intermixed in one way or another.

172. There are several ways or "plans" of distributing or assorting the grooves, the selection of the particular one from among which is influenced by many considerations; as, for instance, the size of the sound-board; the department of the organ for which it is destined; the terms on which the organ is to be constructed, &c.; some description of groove-arrangement calling for a more complicated and costly kind of *key-movement* than others.

173. The old organ-builders, when fixing on the situation of their sound-board grooves, were often influenced much by the design of the case in which the instrument was to be enclosed. For instance, if the case was to have three towers, with the largest one in the centre, say of five pipes each, some of the largest grooves,—namely, those for some of the lowest keys,—were placed on each side of the centre passage-board; i. e. at the *inner* end of the two halves of the sound-board; the grooves next in size, at each *outer* end of the two halves; and the smaller grooves in between the larger. In distributing the grooves after this fashion, the builders had two objects in view; (1) to keep the front pipes, which, of course, were "conveyanced off," and the grooves from which they were to receive their supply of wind, as near to each other as possible; and (2) to distribute the large and the medium sized grooves throughout each half of the sound-board; doubtless from an impression that if all the large grooves were placed at one end of the "half," and the small grooves at the other end, the consumption of wind at one end of the wind-chest might at times be so great as to risk the partial withdrawal of that required for the smaller grooves at the other end.

174. The peculiar and complicated "plantation" of pipes, however, which such a distribution of the grooves rendered necessary, was most inconvenient. It caused a cluster of large pipes to accumulate at each end of the halves of the sound-board; while there were the "prospect pipes" in front, and the large reeds in the rear. The small pipes were thus walled in on all sides; and although little pipes are much sooner affected by change of temperature, dirt, &c. and therefore require looking to more frequently than any other pipes in an organ, except the reeds, yet they were thus rendered the most difficult of access. Several of the large pipes had, in the majority of cases, to be removed before the tuning or cleaning could be commenced; which handling and shifting about, in addition to involving considerable trouble and loss of time, was not unattended with danger to the instrument.

175. These manifest disadvantages soon led to an amelioration of the then pre-

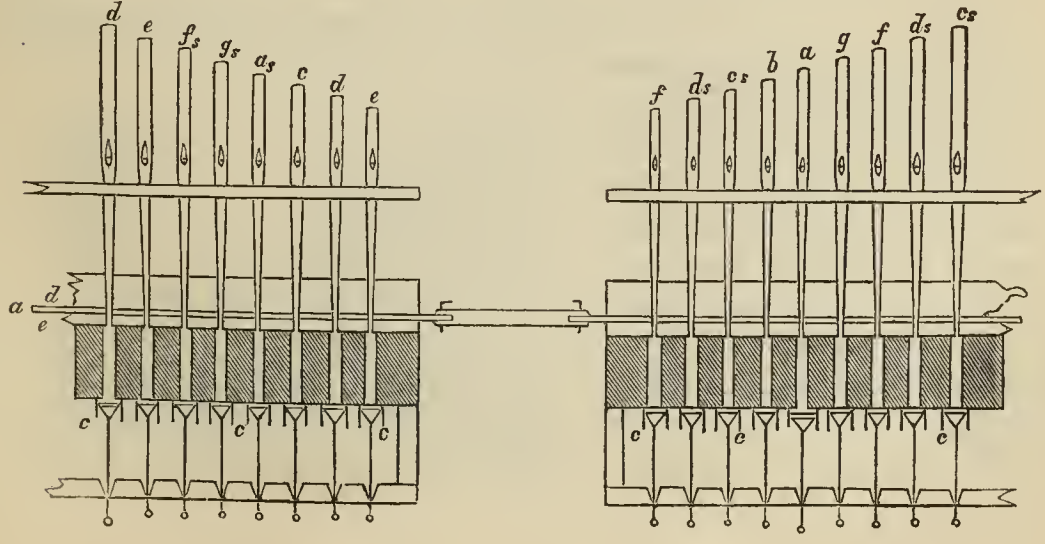
valent method of laying out and winding an organ. The sound-board grooves were made deeper; the pallet-holes lengthened; the wind-chests made broader and deeper; and the dimensions of the wind-trunks much increased. The grooves appear generally to have been made of a satisfactory *width* originally; and the borings in the table, sliders, and upper-boards, were of ample size. These several improvements, and more particularly the subsequent introduction of *double grooves* in the bass, admitting of the introduction of conveyances of larger bore, the close proximity of the large pipes to their grooves, although at all times an arrangement most desirable, no longer remained a matter of such vital importance as before; and, as the old plan of groove arrangement was so very objectionable in all other respects, it was allowed to fall into disuse, and was entirely and finally abandoned before the middle of the last century.

176. At the present time, the English organ-builders usually adopt one of three different plans of groove arrangement, according to circumstances. Some of these plans require the adoption of a special kind of key-movement; and as it will be convenient to refer to these plans separately, the terms "first plan," "second plan," and "third plan," are here adopted; and in the description of the key-movement, they will be briefly referred to under these heads.

First plan of groove arrangement.

177. In the first plan, the grooves are placed alternately on each side of the organ; i. e. the groove belonging to the C C key is planted at the extreme or outer end of one half of the sound-board, the groove belonging to the C C sharp key being similarly situated at the extreme end of the other half. The grooves throughout the sound-board are then arranged in the like alternate manner; ultimately bringing those belonging to the two upper keys (e^3 and f^3 say), one on each side of the passage-board (see *fig.* 49). In this first plan, therefore, the grooves occur in *tonal* succession on each half of the sound-board (see *fig.* 49). The "half" to the left, as the performer sits at the keys, contains the grooves for C C, D D, E E, F F sharp, gamut G sharp, A sharp, and their octaves. To the right are the grooves for C C sharp, D D sharp, F F, gamut G, A and B, with their replicates. As a consequence of this distribution, the largest pipes stand at the *outer* extremities of each half of the sound-board, and the smallest in the *centre*.

49



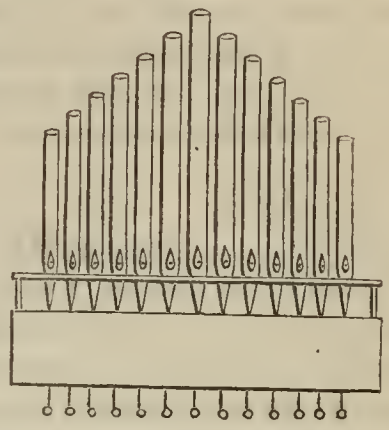
178. This groove arrangement is much used for large great-organ (chief manual) sound-boards, both on account of the symmetrical arrangement of the pipe-work to which it leads, and the facility it offers for the purpose of tuning, &c. The shortest pipes standing, as they then do, immediately on each side of the passage-board, with the largest farthest off, and those of intermediate length between; the tuner can, without difficulty, adjust either the small pipes at his feet, or, reaching over them, arrive at larger pipes, if they require his attention.

179. The half of the sound-board on which the C C groove occurs is called the C side; and the other half, the C sharp side. The "sides" are named after the lowest note on that half of the sound-board. Thus, in a G G organ, the side on which the G G groove is placed is called the "G" side; and so on.

Second plan.

180. The second plan (*fig.* 50) may be described as a *reversion* of the first plan. The groove for the *lowest* key in the scale, instead of the *highest*, is placed in the centre of the sound-board; while the other grooves, instead of *increasing*, decrease as they diverge from the middle. The *largest* pipe of each stop, therefore, is planted in the centre of the sound-board; the two *smallest* standing one at each end. The pipes on a sound-board having the grooves arranged in this manner, present a pyramidal outline, as shown in the accompanying wood-cut.

50

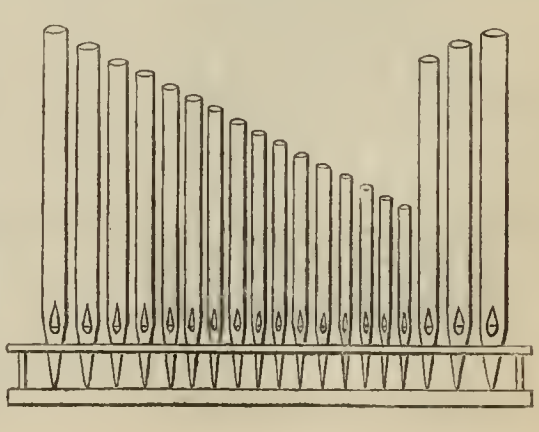


181. This second plan of groove arrangement is very generally adopted for swell sound-boards. It is very seldom that room can be spared inside the swell-box either for a passage-board down the contre, or for one round the pipes. The pipes are therefore arranged according to the second plan; and each side of the swell-box is furnished with a moveable panel. On removing this panel, the pipes of one half of the sound-board present themselves arranged in a graduated series from small to large; and the remaining half of the pipes are reached by the same simple means from the other side of the swell-box.

Third plan.

182. In the third plan, the smallest groove is placed somewhat to the right of the centre of the sound-board—as it is viewed from the front of the case,—and those for every semitone, as far as tenor *c*, are arranged in regular *chromatic* succession to the left of the first groove. Those for the lowest or "great octave" are then disposed alternately to the right and left, as in the "first plan," occupying, as before, the extremities of the sound-board. See *fig.* 51.

51



183. This third plan is most frequently adopted for the chief manual sound-board of small-sized church and chamber organs; and admits of a much more simple kind of key-movement than the first and second plans.

The arrangement of the stops on the sound-board.

184. The stops—or, to use the technical phrase, "contents"—of the great organ are usually so arranged that the flue stops stand in front and the reeds behind; and the largest flue stops, such as the unison and double diapasons, are generally placed first, the remaining stops being planted in rotation according to their size, the mixtures thus being brought next to the reeds. This arrangement of the stops is illustrated by *fig.* 1 in general section. When there are duplications of any stop, as two open diapasons or two trumpets, it is usual to place other stops between the first stop and its replicate. Thus, in Harris's organ, at Doncaster, lately destroyed, the second open was placed between the two trumpets; and in the organ at Ripon Cathedral, by Father Smith, the second open diapason stands between the trumpet and the sesquialtera.

185. The inside choir organ has its stops planted the reverse way to the above, i. e. with the flue stops behind and the reeds in front, that the latter may be under the immediate inspection of the tuner. Thus, in *fig.* 2 in general section, the clarinet and bassoon are placed nearest the passage-board.

186. In the swell, the reeds are usually placed in front—as in the choir,—because the tubes offer less impediment to the egress of the sound than would the more bulky flue pipes. See *fig.* 4.

187. The pedal stops are also planted in the same manner, and for the same reason.

The mechanism of the organ.

188. Having described the apparatus by which wind is collected for the use of the organ; traced its course from that source through the various channels, great and small, till it reaches the pipes; and noticed the sound-board pallets and the sliders by which the organ-wind is made subservient to musical purposes; we will now proceed to investigate, in detail, the several systems of mechanism, through the intervention of which the pallets and sliders of the several sound-boards, and, by consequence, the several pipes and stops of the organ, are brought so admirably under the control of one performer.

189. Of those numerous distinct systems of mechanism, there remain the following to be considered; viz.

The key and pedal movements;
The draw-stop action;
The composition pedals;
The coupling movements;
The sforzando coupler;
The pneumatic action;
The swell action; and
The tremulant.

The sound-board pallets, sliders, and the blowing-action have already been described.

CHAPTER X.

THE CLAVIERS AND KEY MOVEMENTS.

190. BEFORE, however, describing the appliances, through the agency of which the impulse given by the fingers or the feet of the performer is conveyed to the sound-board pallets, a few words may be said concerning the several ranges of keys assigned to *receive* such impulse; namely, the claviers.

The manuals.

191. The organ, as is well known, is played partly by the pressure of the fingers, and partly also by the pressure of the feet, upon suitable claviers or keys. A *clavis* (a word derived from the Latin, and signifying a key, in French called *touche*) is a small lever (from *levare*, to lift-up); and a clavier is an assemblage of such *levers* or "*keys*," rightly assorted. The various sets of keys (of which every perfect organ contains several, and among these at least one for the use of the feet*), are classed under the one general term *clavier;* and those intended to be used with the hands are called "manual claviers," or simply "manuals" (from the Latin word "*manus*" a hand); and that for the feet, "pedal clavier," "pedal-board," or simply "pedals," from the Latin word "*pedes*," the feet. The keys, as well of the pedals as the manuals, are divided into long and short keys, like those of a pianoforte; and the former are readily distinguishable from the latter by their magnified scale.

192. It is necessary to bear in mind the great distinction that exists between the terms clavier, manual, and pedal-board; as, otherwise, frequent uncertainty is likely to arise. The word clavier is of *general* application, and means simply *a set of keys;* which, however, may be for the use of the hands, or for the use of the feet; while the two other words, manual and pedal, are of *special* application, and define for what purpose, and by which members of the body, the clavier so named is to be employed.

193. In Germany, the terms manual and pedal are used in a more extended sense than is usual in England. In that country, they refer to the department of the organ on which the *claviers operate*, as well as to the *claviers themselves:* hence we frequently find it stated that there are so many stops "on the pedal," or so many "on the chief manual." Moreover, when a *manual* is said to be of 8-feet compass —i. e. descends to C C,—the manual *organ* is understood to be of corresponding range,

194. In the present work, the word clavier will be used whenever the passing observation refers equally to the keys for the hands or for the feet. In all other cases, the more explicit terms will be employed.

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* Some continental organs have, in addition to three or four manuals, *two* sets of pedals. This is the case at St Paul's, Frankfort; at Fribourg, &c.

195. The keys of many old organs were made of oak, and had the *naturals* capped with ebony, and the *sharps* with ivory. This arrangement of the black and white keys, however, only remains in such specimens in which the subsequent alterations have not kept pace with the progress of modern improvement. The original keys of many of the old instruments, those of *Smith* and *Harris* for instance, were also very short, and disagreeable to play upon. Those of *Snetzler's* organs were generally longer, and therefore more pleasant to the finger. Previous to the year 1720, the thumbs were but little used in organ-playing, but usually hung down in front of the manual; consequently the portion of the naturals that projected forward in front of the short keys, was made to do so as little as possible, that the fingers might reach the so-called sharps with the more ease. It was the custom, moreover, instead of raising the fingers from the knuckles, to draw them under towards the palm of the hand, which accounts for the short naturals of old organs being scooped out into hollows in the centre by the friction of the nails.

196. When the thumbs came to be more freely used on the naturals (a change in the mode of fingering that took place about *Snetzler's* time), the front part of the naturals was made a little longer; and when at length, in modern times, they were also freely employed on the short keys, those in their turn had to be slightly elongated. Thus, from the naturals being, in old organs, little more than four inches in length in front of the cross-beading, they are in modern instruments often made from five to six, and with the short keys in proportion.

197. The manual keys of modern organs are usually made of lime-tree wood, with the surface of the long keys covered or capped with ivory; and that part of the short keys which rises above the level of the naturals, is either made of ebony or some other wood stained black. Each manual key is punctured towards its centre with a small hole, passing downwards, to admit a metal pin (*a*, *fig.* 52),

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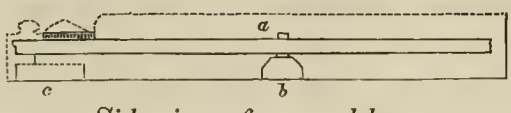

Side view of manual keys.

that rises from a piece of wood or pin-rail beneath (*b*), and which pin serves as a pivot for the key to work upon. The hole through the key is not cut exactly midway between the two ends, but rather nearer to the back end, leaving about five-ninths of the entire length in front of the pin. A second hole is bored in the underside of the front end of each key, to admit a pin that rises from a rail (*c*) running across under the front of the keys, and upon which pin the key descends as it falls. This pin renders the fall of the key true and steady under the finger. Two or three *thicknesses* of green baize, or some such woollen stuff, laid at the root of the pins, prevent the keys from coming into noisy contact with the front-rail. These two rails are strongly united to two pieces of wood, called *key-checks*, the front ends of which appear on each side of the set of keys, finished off in something of an ogee form, as indicated by the dotted lines in *fig.* 52. As the manual keys would, on the removal of the finger, spring up beyond their proper level under the influence of the returning "key-movement," unless something were done to check them, a piece of wood is laid transversely across the keys, immediately to the rear of the veneered part, so as to be just out of sight, which is loaded with lead on the upper side to make it so heavy

as to stop the rise of the key, and lined underneath with green baize to silence the blow of the key against the board. This piece of wood is called the *thumping-board.*

The pedals.

198. The pedals are made either of oak, mahogany, beech, or some other hard wood, and are, as before said, chiefly distinguishable from the manual keys by their magnified scale; the order of the keys, long and short, being the same in both cases. The pedals work on a centre at the back (*a, fig.* 53),

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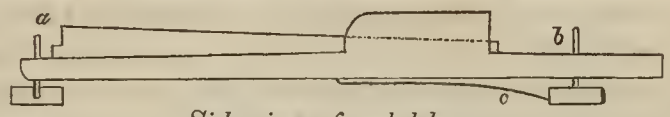

Side view of pedal keys.

and fall under the pressure of the foot, in front (*b*), that is, at the end under the manuals. A spring under each pedal (*c*) causes them to resume their original position on the removal of the foot. The pedals are placed at a proper distance below, and under the manuals, that they may be conveniently played upon by the feet of the performer.

The situation of the claviers.

199. The claviers of an organ are usually placed in the front of the organ-case, in the centre, just beneath the impost; though want of room and other circumstances sometimes render other arrangements necessary. Thus they are occasionally found at the side, as at Hanover Chapel, Regent Street; or even at the back, as at Christ Chapel, Maida Vale. In some instances, the claviers are not in the instrument itself, but separate, and, to all appearance at least, unconnected with it. This is the arrangement observed in the organ at Windsor Castle, constructed on a plan suggested by His Royal Highness the Prince Albert, where the keys appear in a kind of manual table, situate twenty-two feet from the body of the instrument. At Westminster Abbey, again, the claviers are similarly detached; the great organ being in front, the swell behind, the choir to the right, and the pedal organ, with its large pipes lying horizontally, to the left of the organist. The Apollonicon had its numerous claviers so arranged that the several performers sat looking towards the audience.

200. Concert-room organs are generally furnished with what is called a "long movement," a modification of the usual mechanism that admits of the keys being placed in the front of the orchestra, while the instrument itself stands at the back. The first long movement made in England is said to be that attached to the organ in Vauxhall Gardens, by Byfield, and which served Green as a model for the long movement applied by him to the organ he erected for the Handel Commemoration in 1784. At All Saints' Church, Manchester, the communication between the keys and sound-board pallets is established by means of a movement 87 feet in length.

201. But the most remarkable long movement is that attached to the organ in the church of St. Alessandro in Colonna, at Bergamo, built by Serassi in 1782. The organ has three manuals, the first and second of which serve for the great and choir organs in the same part of the church; while the third, by means of a long movement passing underground, acts upon another great organ situated at a distance of nearly 115 feet from the keys.

202. Some organs have two, three, or even four manuals. These are arranged

one above another, and so that the lowest stands out farthest, and each succeeding one recedes.

203. In an organ having two manuals, the keys of the great organ form the bottom row, and those of the swell the upper. Where there are three manuals, the great manual is usually in the middle, with the swell above and the choir below. In Avery's organ, at St. Margaret's, Westminster, however, the great manual is below, and the choir organ keys in the centre.

The key-movement.

204. The key-movement is that system of the mechanism of an organ which establishes the communication between the keys just noticed and the sound-board pallets that control the entrance or otherwise of the wind from the wind-chest into the grooves.

205. For each clavier there is usually a separate "movement." And as the clavier and its corresponding sound-board are variously located in regard to each other, according to circumstances,—sometimes being placed in close proximity;—at other times at a long distance apart;—sometimes in a direct line with each other;—at others at right angles;—sometimes so that the performer faces the organ;—and at others so that he sits with his back to the organ;—it is obvious that the "movement" introduced for the purpose above mentioned must not only vary very much in detail in various examples, but in some cases must be far more complex than in others. This would be the case even if the grooves were always arranged in the same order; but as they are sometimes disposed agreeably to the regular semitonal "third plan," and sometimes according to the crossing first or second plans, the key-movement from this cause becomes in some respects still more diversified.

206. Yet, although so multifarious as to detail, there are in reality only two distinct kinds of key-movement in common use in England; namely, the *lever* or *fan-frame* movement, and the *roller-board* movement. A third kind is noticed in a subsequent chapter.

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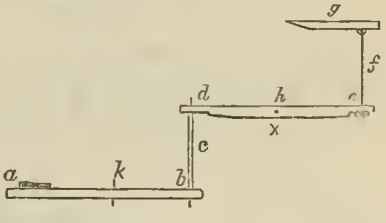

207. The *fan-frame movement* is the simpler kind of the two. It consists of three parts only; namely, a small upright rod, called the *sticker* (*c*; *fig.* 54) a horizontal lever, called the *backfall* (*h*); and a second vertical rod, called the *tracker* (*f*). The lower end of the sticker (*c*) rests on the tail (*b*) of the key (*a*), and the near end (*d*) of the backfall (*h*) on the top of the sticker. The far end (*e*) of the backfall is attached to the tracker (*f*), which latter passes up perpendicularly and communicates with the pull-down that draws open the pallet (*g*).

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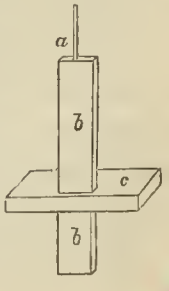

208. The *stickers*, which are made of pine or cedar, and of a round or square shape, reach from the key-tails to the backfalls—a height varying from a few inches to a foot or two, as may be requisite. From the top of each sticker a wire pin rises about an inch (*a*, *fig.* 55), and passes through a puncture in the backfall, to prevent its slipping off instead of rising with the sticker. A small piece of woollen stuff, placed over the top of the sticker, prevents that and the backfall rattling together; a similar noise at the lower end being obviated by the leather on the tail of the key already noticed.

209. Sometimes the stickers are made to pass through a *register*—a rule of wood laid transversely and flatways above the tails of the keys, and perforated (*c*); in which case, they have each a small piece of wood or leather attached. This, by resting on the register, prevents the sticker falling through, and so allows of the temporary removal of any key, or even the entire set, without disturbing the arrangements of the stickers.

210. The *backfalls* are made of some hard wood, such as oak or cedar, and of the shape indicated in the adjoining cut (*fig.* 56).

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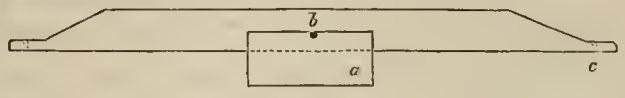

They range from one to about three feet in length, according to the distance, in a direct line between the pallets and the keys; from one to two inches in depth; and from three-sixteenths to one quarter of an inch in thickness. A small wooden beam, called the *backfall-frame*, sustains them in their proper situation; the frame itself being scored crossways with numerous narrow cuttings, made to receive that portion of the backfalls which is below the centre. The centre consists of a piece of stout iron wire passed through the middle of each backfall, and fastened down with small staples.

211. The *trackers* (*fig.* 57) are so many strips of some light wood, as pine, measuring about five-sixteenths of an inch in width, one-eighth in thickness, and, in the situation under consideration, not more than about two feet in length. Each tracker is furnished at the lower end with a *tap-wire* (*b*)—a piece of brass wire about three inches long, incised or *tapped* at one end like a screw, and slightly hooked at the other, by which it is bound to the tracker with thread, afterwards covered with size. The upper end is provided with a hook (*a*) of copper wire, that communicates with the pull-down.

57

212. The tap-wire at the lower end is passed through a small hole in the free end of the backfall, indicated by dotted lines at *c*, in *fig.* 56; and the latter is then firmly secured to the former with a small circular piece of leather, about one-third of an inch in diameter, turned out of thick leather like that used for the soles of shoes, and called a button (*c*, *fig.* 57).

The action of the key-movement.

213. The several parts just described operate one on the next in the following manner. On pressing the key (*a*, *fig.* 54) down, which moves on a centre (*k*), the tail (*b*) rises, lifting with it the sticker (*c*). This in its turn raises the near end (*d*) of the backfall, which, by moving on the centre (*h*), causes the far end (*e*) to descend. In doing so, it draws down the tracker (*f*), which pulls the pallet (*g*) open.

214. Some of the wind from the wind-chest now rushes through the pallet-hole into the groove, and from thence makes its escape through such apertures in the roof as have been opened by the drawing of the sliders above; but, in doing so, it is compelled to pass into pipes placed over those holes, which makes them sound; and having thus performed its destined duty, it regains its freedom.

215. The key-movement just described is found chiefly in conjunction with a sound-board made according to the "third plan," and, therefore, most frequently in

small organs. Where the grooves follow in semitonal succession, rollers are not usually required; and, as simplicity in the mechanism is alway desirable, the above movement, as the least complex, is preferred, where and so long as the consecutive groove arrangement is observed. This accounts for the omission of rollers, as also for the presence of the backfalls *as levers;* though not for their taking the *fan* form, which latter circumstance arises from another and independent cause.

216. A sound-board is always wider than the manual, sometimes extending to twice its width, or even more. It follows, therefore, that the grooves, instead of running parallel with their respective keys, and differing only in being located at a higher level, are, with few exceptions, more or less *out* of the line with them. This being the case, and yet it being necessary that the far end of every backfall shall be under its own groove, at the same time that its near end shall still rest on its proper sticker, all the backfalls, with the exception of the middle two or three, which swerve but slightly, are made to diverge, until at last the extreme ones are at one end considerably out of a line with their near end.

217. This spreading out of the backfalls causes the set to bear a sufficient resemblance to the ribs of an open fan, to account for the adoption of the name by which this portion of the movement is generally known.

218. In the notice of the "third plan" of groove arrangement, it was mentioned that the grooves for the lowest or bass octave were placed alternately at each end of the sound-board. While, therefore, all the bass keys are to the left extreme of the manual, six of the corresponding grooves, at the least, are at the extreme right of the sound-board. To bring these, through the governing pallet, under the control of their respective keys, a horizontal rod or roller is provided for each key, extending along behind the backfalls, to transmit the motion the requisite distance to the right.

219. These rollers—of which the accompanying engraving (*fig.* 58) is a plan—

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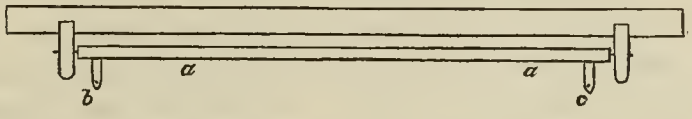

(*a a*) are each provided with two arms (*b c*), one (*b*) projecting immediately over the descending end of the backfall, the other (*c*) directly under the pallet. Instead of the tracker now drawing down the pallet as before, it lowers the first roller-arm (*b*); and the roller itself (*a a*) being thus made partly to revolve, conveys the downward motion to the second roller-arm (*c*), which, descending, draws with it a second tracker in communication with the pallet-wire, which latter opens the pallet. The rollers just referred to are made from an inch to an inch and a half in width, from five-eighths to one inch in depth, and from an inch or two to about five feet in length. They are each provided with two metal *centre-pins*, projecting about an inch from each end, which pass into holders or *studs* standing out from the *roller-board*. These pins form the centre at each end on which the roller partly revolves, while the studs hold them suspendedly over the keys.

220. The rollers are mostly ranged one over the other; though in some cases, where convenient, two are placed in a line. In cramped situations, wooden rollers are omitted, and iron ones substituted, as occupying much less space. The arms of the rollers, which are, in the instance of wooden rollers, made either of wood or iron,

are best of the former material, as the metal arms, coming in contact with the metal hooks of the trackers, are very apt to cause a rattling noise. They are, however, more costly.

The roller-board movement.

221. The second variety of key-movement is that known as *Roller-board Movement*. This description of movement is a usual accompaniment to all sound-boards in which the grooves are disposed acccording to the alternate or any other irregular arrangement, and is therefore a common adjunct to such as are made agreeably to the "first plan" among others.

222. In a sound-board so constructed, the CC and CC sharp grooves and pallets occur, in separate halves of the sound-board, at a distance sometimes of 7 or 8 feet from one another, while the keys lie side by side on the manual. And all the other grooves, as already explained, are arranged alternately right and left, while the keys of course continue their scale gradually and uninterruptedly upwards. In consequence of the order of the keys and grooves never agreeing, every key is generally furnished with a roller. After the motion of the key, therefore, has been conveyed *inwards* to the necessary distance, which is effected, in this case, either by *parallel* backfalls, or by squares and trackers, it is transferred to the right or left by a long or short roller, until it is brought under the right pallet. The groove arrangement therefore leads to the introduction of a great number of rollers, and the movement is in consequence named after them. The roller-board, which sustains the roller, is the large irregularly shaped board, or sometimes a frame, that may be seen placed edgeways, and occupying much of the space under the wind-chest, and extending to nearly the entire width of the sound-board.

The extension of the key-movement.

223. But, in most organs, some of the sound-boards are necessarily situated at a greater distance from their manuals than that to which the key-movements, in the condition already described, can reach; more particularly those for the choir and swell departments, as will be obvious on referring to the general section. A modification and extension of one of the movements just noticed—usually of the roller-board movement—therefore becomes necessary, and is effected by first dividing it. The roller-board still occupies its usual position underneath the sound-board, and the stickers theirs on the tails of the keys. The backfall frame is altogether dispensed with, and the communication between the stickers and now distant rollers is established by "square and tracker-work."

224. The "work" last mentioned may be familiarly compared to the crank and wire-work of bell-hangers (see general section). The trackers traverse distances either horizontally, perpendicularly, or diagonally, like the wires, while the squares transmit the motion round corners, from one tracker to the next, like the cranks.

225. The trackers in the modified movement now under consideration are often made very long, extending to 10 or 12 feet, or even more; or, what comes to the same end, several shorter trackers are hooked together, so as collectively to make up the necessary length. These great "lengths" of tracker are generally carried through registers or bridges, which afford them support, if they run horizontally, and also prevent their flapping together. The pedal movement, which in most examples

closely resembles the last-mentioned, is noticed in conjunction with the pedal coupling movement.

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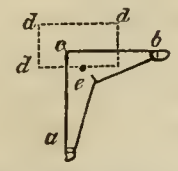

226. The *squares* mentioned just now are so many centres (see *fig.* 59), formed of some tough wood, furnished with two arms each (*a b*), about 3 inches in length, also of the same material as the square, or sometimes of iron, though the latter is not so good, on account of the rattling which it causes. The angle (*c*) of each square is placed in a corresponding cutting made in the *square-frame* (*d d d*) to receive it, and the squares are sustained in their proper positions by a small metal rod (*e*), on which they move freely to and fro.

227. Occasionally, squares are cut out of a single piece of wood; but that is not a good way of making them; for, in that case, one arm must necessarily be the cross-way of the grain, and will not long bear the "tug," but will snap off short. A much better kind of square is that wherein two pieces of wood are dovetailed together, at a right angle, the strong way of the wood; but these are more expensive, at the same time that they are much more durable. Mr. Forster, of Hull, has a plan of fixing his squares so that any one can be taken out separately, without disturbing the set of 50 or 60 to which it may belong.

CHAPTER XI.

THE COUPLERS, AND SFORZANDO PEDAL.

228. BESIDES the several *primary* systems of mechanism already described, which are indispensably necessary for working the organ at all, most instruments are provided with a greater or less number of members belonging to an important *subsidiary* class, called *coupling movements*, or, more briefly, *couplers*.

229. A coupler is an appliance by which either a second clavier and its stops can be brought into play while the performer's hands or feet are engaged upon the first, or the same clavier can be united to itself in the octave above or below; in any case, the result being an increase of the resources of the department receiving such accession. For the time being, the stops or pipes, according to whether the coupled be another clavier altogether, or the pipes of the same clavier, but united in the octave above or below, appear to belong to the key *actually struck*, and new combinations and effects become thus produceable, which are not otherwise attainable on the same instrument.

Manual couplers.

230. Couplers are classed under two heads; viz. Manual Couplers and Pedal Couplers. Of the former kind there are three varieties; namely, Unison, Octave, and Double Couplers.

231. The *Unison* kind of manual coupler unites any key of one manual to the corresponding key of another. One of the most usual couplers of this nature is that for uniting the upper manual to the lower; in other words, for attaching the "swell to great." This is commonly formed of a set of short stickers (*v*, *fig.* 60), one to each key, reaching from the upper surface of the great organ key to the under side of the swell key. These stickers pass through a rod (*k*) extending over the great organ key-board from side to side, between the centre and tail of the keys, and between the 2 manuals. This rod is capable of being turned partially round by drawing out a handle at the side of the keys, communicating with appropriate medium work, which places the stickers in a perpendicular position, as shown in the accompanying cut. If any key of the lower manual (*a*) be pressed down while the "coupler is out," the sticker above will be raised, lifting the tail of the corresponding key on the upper manual (*b*), so that whatever is played on the lower manual is also executed on the upper. When this union of manuals is not required, the governing handle is thrust in, causing the rod and consequently the sticker to resume their original positions, as

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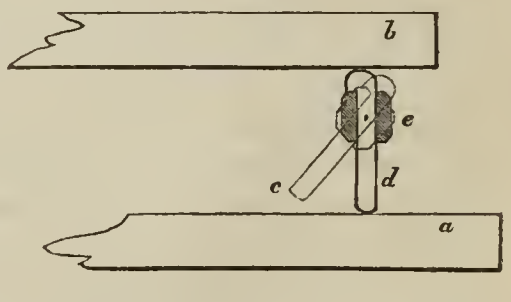

shown by the dotted lines. That of the latter at such times is at an angle of about 45 degrees with the great manual keys; their lower ends (*c*), being then raised sufficiently far to admit of the keys of the under manual being set in motion without coming in contact with them. The *tumbler* coupler has a tendency to throw the fingers off the keys, when drawn on while the great organ is being used. This defect does not appear in the *sliding* coupler represented in *fig.* 61, which is formed in the following manner: The great organ key has a portion of its upper side cut away, leaving an inclined plane (*a*), covered with leather and black-leaded. The under side of the swell key is similarly hollowed (*b*), the shape of the cutting being reversed. The coupler, when not *in action*, is stationed as indicated by the dotted lines, the sticker (*l l*) dropping into the register (*n n*). The hollow in the great organ key then allows the key to rise without touching the sticker. When required to be used, the register, which is held and moves freely in a *slot* in each key frame, is carried a little backwards (*o o*), the sticker (*c c*) glides up the inclined plane (*a*), is raised a little way out of the register, and brought directly under the regulating button (*d*), by which it raises the swell key. The back part of the knob of the sticker is bevelled (*e*), so that, in the event of a great organ key being down when the coupler is drawn on, the sticker may raise the swell key gradually without causing any jerk to the finger, and the button (*d*) is rounded to assist its coming into operation smoothly and quietly. Through the swell key a tapped wire passes (*f*), by which the action of the coupler is so nicely regulated that the swell key will begin to descend at the same moment that the finger commences the depression of the key of the great organ. This improvement on the tumbler coupler is due to Messrs. Kirtland and Jardine, organ-builders, of Manchester.

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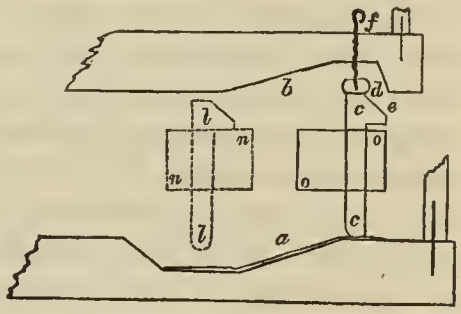


232. Another kind of mechanism for the coupler "swell to great," called from its shape the "*ram* coupler," also possesses the merit of being capable of being drawn while the keys are down, without causing any disagreeable resistance, and without being liable to derangement from being brought into operation under such circumstances. This kind of movement was invented by the Messrs. Robson, and has been applied by them to the pedal couplers, as well as to those for the manuals.

233. An organ with 3 manuals occasionally has, in addition to the coupler above described, another for uniting the lower manual to the middle one, i. e. "*choir*" to "*great.*" A third kind of unison coupler unites the upper manual to the lower ("*swell*" to "*choir*"), of which examples occur in the organ at St. Paul's Cathedral, &c. Other couplers take down the octave above or the octave below the key pressed down by the finger.

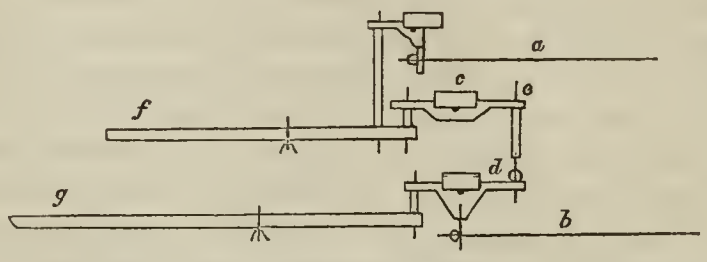
234. An "*octave* manual coupler," i. e. one acting in the forementioned way, was introduced into the organ at St. James's Church, Bristol, by Smith, of that city, in the year 1824; another, and like that just noticed, forming part of the original work, occurs in the York Minster organ, built in 1829 by Mr. Hill. Both these unite the *swell* to the *great organ* in the octave above. Octave couplers are frequently

found in the organs of Italy, where they are called *Terzo Mano*, third hand. In England, this kind of coupler is called by the organ-builder who *re*-invented it—for Mr. Holdich does not appear to have been conscious of its pre-existence elsewhere—the Diaocton. A "*double* manual coupler" either unites one manual to another in the octave below, or a manual to itself in the same manner; generally the former. The organ in St. Dunstan's Church, Fleet Street, erected in 1834 by Robson, has one that attaches the choir organ to the great in this way. This acts on separate pallets in the sound-board, and therefore does not move the keys. Octave and double couplers sometimes take down the keys, and sometimes not. Composed usually of a series of diagonal backfalls, they either communicate with separate pallets, when the keys, of course, do not fall, or they operate upon the same set of pallets; the working of the movement being then made obvious by the motion of the keys, as in the case of the ordinary couplers, unless indeed the key-tails are weighted (as they sometimes are) to balance them. The swell manual of the organ at St. Luke's Church, Old Street, made by Gray and Davison, has both an octave and a double coupler. By the aid of such couplers "an 8-feet stop may be converted into a 16-feet, or a 4-feet (or all three), at pleasure; and a great variety of effects and combinations may be produced, which otherwise would be unattainable without increasing almost indefinitely the size of the organ*."

The sforzando coupler.

235. The *sforzando coupler* is a movement for reinforcing the strength of the swell instantaneously, and to a far greater extent than is attainable by the aid of the swell pedal alone. It is worked by a pedal, on pressing down which the great organ becomes coupled to the swell. On removing the pressure from the pedal, it returns (by means of a spring), and the action is disconnected. The action simply is a backfall in connection with the swell key, and operating on the great organ key movement; as shown in *fig.* 62, in which *a* repre-

62



sents the swell tracker, *b* the great organ tracker, *c* the connecting backfall in question, which rises and falls on the sticker *e*, the pin being free, while *d* marks out the regulating button. In a few instances, where the swell has been provided with octave and double couplers, the sforzando pedal has been made to bring on those couplers simultaneously, and *not* act on the great organ; and where the swell is to C C, and is powerful, this latter kind of movement is in some respects more effective than the other, as the *reinforcement* is also under the influence of the swell.

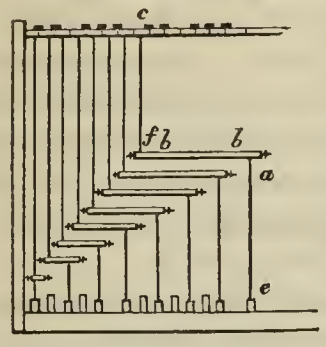
236. A sforzando pedal, uniting the great to swell, was introduced by Lincoln

* Pole, on the Musical Instruments in the Great Exhibition of 1851, p. 75.

into his organ at St. Olave, Southwark, built in 1844, and it has subsequently found admission into several other instruments.

Pedal couplers. 237. The second class, i.e. the *pedal couplers*, are such as either unite the manuals to the pedals, or cause the pedal organ to play in the octave, one way or the other, as well as in the unison. Of pedal couplers there are as many varieties as there are of manual couplers. The most common form of the pedal coupling movement is the following: First, in consequence of the pedals occupying much more room in regard to width than the corresponding number of manual keys, rollers similar to those in the key movement are introduced (see *b b*, *fig.* 63), having one arm (*a*) *over* the controlling pedal (*e*), and a second (*f*) directly *under* the key to be communicated with (*c*). The action of the pedal having thus been brought into a line under the key, a backfall (*o*, *fig.* 64) occurs running underneath and parallel thereto. From each of these, a sticker (*a*) reaches thence to the under side of the manual key (*c c*), to be acted upon; a pin in the lower end (*e*) of each sticker, descending through the end of the backfall, to render the former in one sense a fixture, the upper end being left free to be moved forward or backward as occasion may require. The stickers pass through a register (*b*), which, among other purposes, serves as a support thereto. When the manual is to be coupled to the pedals, the register is drawn forward a little, the upper end of the stickers being thus brought immediately under the tails of the manual keys. They are represented as being thus situated in the last illustration. When the pedal coupling action is in operation, the two trackers, the roller arms, and the near end of the backfall, all descend when a pedal is depressed, the far end of the backfall (*e*) rising, lifting with it the sticker (*a*), which in its turn raises the tail of the manual key (*c*), and this, setting the key-movement in motion, produces the same effect as pressing the key down with the finger would do. When the union of the "manual to pedal" is no longer required, the handle is pushed in, which moves the register back again, the upper end of the stickers being by this guided in the same direction till they get just beyond the key-tails. The stickers now appear in a slanting position, as shown by the dotted lines in *fig.* 64, and *miss* the keys. Sometimes there are 2 or even 3 couplers for uniting the different manuals to the pedals in the same pitch; as "great to pedal," "choir to pedal," and "swell to pedal;" in which case there are as many sets of these stickers rising from the backfalls, each communicating with a particular manual.

63



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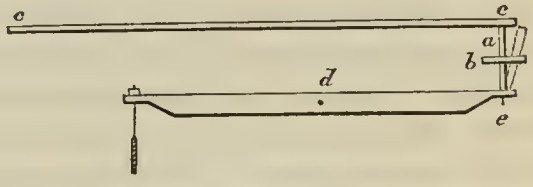


238. Thus much concerning the *mechanism* by which the manuals are coupled to the pedal. With regard to the *pitch* in which this union is effected, great dissimilarity unfortunately prevails in England. In some organs, the key acted upon by any given pedal will be identical with the one that the finger would have touched; i.e. corresponding with the bass note written and sounding in unison with the bass voice.

This is always the case with manual organs of the C C compass. In such cases, the manual unison stops are said to give the 8-feet (their legitimate) pitch. In G G, F F F, and C C C organs, however, the pedal couplers more often attach the manuals in the octave below to the pedal, that is, in the 16-feet pitch. This want of systematic arrangement arises from there being no recognized *compass* as the invariable one for the manuals of English organs. Some organs of *long* manual compass have pedal couplers acting in the 8 *and* 16 feet pitch on the great manual; as in that at Westminster Abbey, built by Mr. Hill.

239. In the organ in Trinity College Chapel, Cambridge, is a coupler, called the *Canto Fermo* coupler, that unites the treble of the choir organ from middle c^1 upwards to the pedal, to the extent of two octaves and a third. This causes the 8-feet stops of that manual organ to produce the effect of so many 2-feet pedal stops. Other organs have a coupler for uniting the tenor c of the swell to the C C C of the pedal, as in the instrument at the Irvingite Church in Gordon Square, built by Davison, which obtains, from the unison stops of the forementioned department, a sound resembling that of so many 4-feet pedal stops.

240. Besides couplers for uniting the manuals to the pedals in various ways, others are occasionally met with which attach one octave of the pedal *organ* to the other. One kind (octave coupler) brings the C C pipe on to the C C C pedal, the effect being similar to that of the addition of an 8-feet principal to the 16-feet open diapason. A second kind (doubler coupler) brings the C C C pipe on to the C C pedal; thus giving the effect of a 32-feet stop on the pedals from thence upwards. Both kinds were added by Walker to the organ in Tonbridge church.

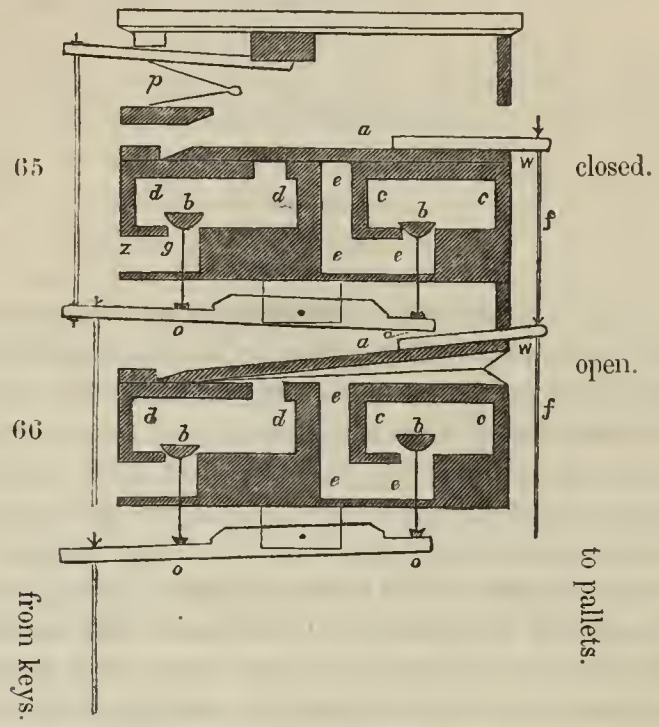
CHAPTER XII.

THE PNEUMATIC ACTION.

241. It has already been shown that every sound-board pallet is provided with a spring beneath, to ensure the return of the key-movement on the withdrawal of the pressure from the key; and it has also been mentioned that the compressed air in the wind-chest becomes a second source of resistance to the touch of the performer. This latter fact is discernible, even in small organs, of which the sound-boards are palleted in the ordinary way, by striking a chord in the bass part of the manual, first without the bellows being blown, then with the "wind in," when the additional resistance which the organ-wind causes will be at once perceived. In larger organs which have pallets of increased size throughout the sound-boards, with two pallets in the bass, the amount of spring and wind resistance is of course much increased, particularly where there are also octave and double couplers, causing perhaps six or seven pallets to operate upon one key. But in instruments of the first magnitude, containing, as they now usually do, some stops on a heavy pressure of wind, the resistance becomes too great for even the most muscular finger to control without experiencing much fatigue. In such cases, it being beyond the power of the several devices detailed in Chapter V to *remove* the disagreeable stiffness from the touch, or perhaps none of them may be adopted, some contrivance is required that shall boldly *overpower* the resistance. The pneumatic lever performs this necessary duty most efficiently; and, in doing this, ingeniously converts that which would otherwise be the organist's antagonist, into his assistant.

242. The first idea of a pneumatic lever originated with the late Mr. Booth, organ-builder, of Wakefield; but his appliance, made in 1823, was not intended for key-movements. The merit of discovering the pneumatic lever, as a means for lightening the touch of large instruments, is claimed by, and rests between, Mr. David Hamilton, of Edinburgh, and Mr. Barker, a native of Bath, but now a resident of Paris. Mr. Hamilton added a movement of the kind to the Organ in St. John's Episcopal church in that city, in 1835. At what *earlier* period he had completed his model is not stated; but, in 1839, a paper was read at a meeting of the British Association at Birmingham, explanatory of a pneumatic lever which he then exhibited. Mr. Barker's first attempts were made with a cylinder and piston, which were afterwards abandoned in favor of a small bellows. "In the first instance, he

endeavoured to introduce his apparatus in England, about 1832. Experience, however, in large organs, was then wanting in this country, and his endeavours were unsuccessful; he therefore went to France, where the subject was better known, and where the value of the new principle was at once appreciated. It was introduced immediately, in the great organ, building at St. Denis (1841), and has since been applied to a considerable number of large instruments in the principal churches of France*;" as, for instance, at the Madeleine, St. Vincent de Paul, &c.



The pneumatic action shown at large.

243. The pneumatic lever, as made by different organ-builders, varies slightly in detail; but the following is the plan and principle of all. The upper member of the lever is formed very like a small concussion valve (see *a*, *fig.* 65 and 66); the former of which shows the lever *closed*, the other *open*. Beneath the lever are two little chambers (marked *c c* and *d d*), between which passes a third (*e e e*). Below again is a kind of backfall (*o o*) which controls two circular pallets (*b b*) in such a manner that when one is open, the other is shut. Lastly, to the rising end of the lever a small lug (*m*) is attached, which draws up a tracker (*t*) that sets the several key-movements in motion.

244. On pressing down a key on any one of the manuals, the movement draws down the near end of the backfall (*o o*), causing the far end to rise, which motion places the circular pallets (*b b*) in the positions shown in *fig.* 66. Some of the wind from the chamber (*c c*) now passes downwards through the uncovered pallet-hole, traverses the passage (*e e e*), raising and filling the pneumatic lever (*a*), which draws up the tracker (*t*), communicating the impulse to all the sound-board pallets that may be attached to the controlling key. The circular pallet in the second chamber (*d d*) at the same time closes and prevents the escape of any wind.

* Pole, on the Musical Instruments, &c. p. 77.

245. When the finger is withdrawn from the key, the position of the backfall, and consequently of the circular pallets, is reversed, as shown in *fig.* 65. The supply of air from the wind-chamber is now cut off by the descent of the pallet. At the same time the second pallet in the chamber (*d d*) is raised, allowing the wind to descend through the pallet-hole (*n*), escaping through the opening (*z*) into the atmosphere. The contents of the lever being thus exhausted, it returns to its state of rest, as shown at *fig.* 65; the rapidity of the change being accelerated by the spring (*q*). In consequence of the width of the pneumatic levers, about three inches, only every *fifth* lever is placed in the same row; hence the pneumatic action always appears in five tiers, as shown in the "general section."

246. The pneumatic action, which effects such remarkable results as those already detailed, is not entirely unattended with disadvantages. In many of the specimens made by the best builders, Continental as well as English, the working of the levers is as audible as the motion of the rattling key-movements of old organs. This arises partly from the nature of the action itself, which, to be effectual, must necessarily also be very energetic. Nevertheless, the defect alluded to will, no doubt, be speedily ameliorated, if not entirely removed, under the exercise of the ingenuity possessed by so many of the English builders.

CHAPTER XIII.

THE DRAW-STOP ACTION.

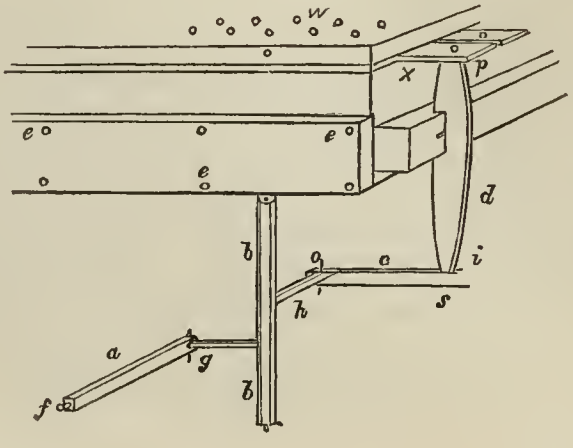
247. THE several longitudinal series of pipes on the various sound-boards have already been explained to be governed by sliders, which either permit the wind to enter the pipes or not, as circumstances may require. The sliders that exercise this power, however, like the sound-board pallet, are always situated beyond the reach of the performer, and sometimes at a very long distance from or even behind him; hence a special system of mechanism becomes necessary to bring them under his perfect control. The mechanism introduced for this purpose is called the "draw-stop action," of which there are, as with all the systems of mechanism in an organ, many varieties, designed to meet the exigencies of particular cases.

248. The first kind proposed to be noticed, is that which may be described as the *Wooden-trundle Draw-stop Action.*

The wooden-trundle draw-stop action.

249. To understand the necessity for the presence of the several parts of the action just named, it is requisite to point out the relative position of the performer, and the end of the sliders to be operated upon. We will suppose the sound-board to be ranged longitudinally immediately behind the front pipes—the usual position occupied by the great organ sound-board. The situation of the slider-ends, then, as compared with that of the organist, would ordinarily be inwards; to the right, we will suppose, though it may be the left; and upwards to a higher level. This route is, in the above action, followed by the draw-stop-rod (*a*, *fig.* 67) which traverses the organ inwards; the trundle (*b b*), which conveys the motion round an angle, the trace (*c*), which continues the motion at right angles with the draw-stop rod; and the lever (*d*) which conveys it upwards.

67



A description of its several parts.

250. *The draw-stop rods* usually measure about an inch square across, for they are made round or square according to fancy, and from about one and a half to ten feet or more in length, according to the distance of the trundle from the manuals. The front-end is made of oak, and the remainder of pine; the two parts being neatly spliced together. The near end of each draw-stop-rod is furnished with a handle, formed of some dark-coloured and handsome-looking wood, into which is inserted a circular plate of ivory, bearing an inscription, announcing the kind of stop that is controlled by that particular handle and attendant parts. The farther end of the rod has a horizontal mortise made in it to receive the trundle-arm, a small iron bolt fastening the two together, so that the one cannot be drawn forward without the other accompanying it. The draw-stop rods run horizontally from the front of the case inwards, in the direction of the back of the organ, bordering the manuals (with which they run parallel) usually on each side, where they are arranged one over another, forming one, two, or three tiers, as the case may be.

251. *The wooden-trundles* are made of good thickness, to prevent their springing; which casualty, were it to occur, would prevent the perfect drawing or closing of the slider. Each trundle is furnished with a stout pin at both ends, which passes into frame-work above and below, and which form pivots for it to revolve upon. The *arms* (*g h*) are made of wood or iron; the former material, however, rendering the action more quiet in its operation. They have no fixed positions; but the first arm (*g*) is placed as nearly as possible in a line with the draw-stop rod (*a*) that is to act upon it, and which may be high or low in the row wherein it appears; while the second (*h*) is placed in a line with the lower end of the lever (*d*).

252. The trundles usually stand under the sound-board to which they belong, bordering the draw-stop rods perpendicularly, as the rods do the manuals horizontally.

253. *The traces* are rods of deal, reaching from the second arm of the trundle to the lower end of the lever; hence their name. They are mortised at each end; at the one (*o*), horizontally to receive the second trundle-arm; at the other (*i*), vertically, to admit the lower extremity of the lever. The traces may usually be seen under the sound-board, running in the direction of its length.

254. *The levers* are generally constructed of some hard wood, as oak, beech, &c.; though in some old organs they are met with of iron. They are hung on a centre about two-thirds from the lower end, and the lower extremity is narrowed to allow of its admission into the motise in the trace; while the upper is made altogether smaller, that it may pass into a hole prepared for its reception in the projecting end of the slider.

How the draw-stop action operates.

255. When the organ is about to be used, the inscriptions that are on the stop-handles, or sometimes over or at the side of them, are referred to, and the handle bearing the desired name is drawn *forward*. The rod brings with it, in the *same direction*, the first arm of the trundle (*g*, *fig.* 67), and the trundle itself (*b*) partly revolving, causes the second arm (*b*) to swerve round and draw the trace (*c*) in the direction from the *side* towards the *middle* of

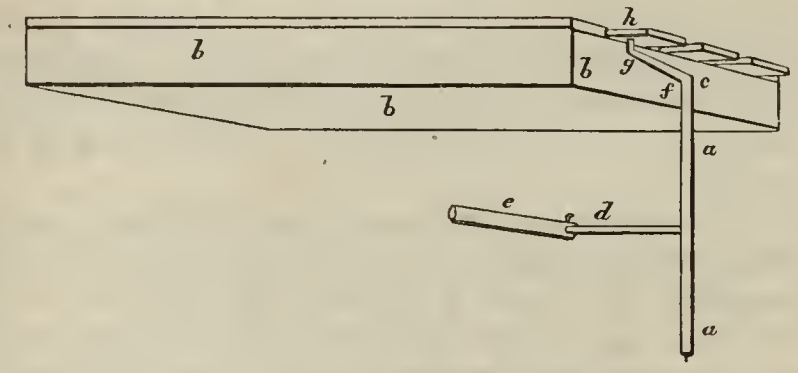
the organ. This latter having the lower end of the leaver (*i*) fastened to it, draws that with it *inwards;* the upper end (*p*) in consequence taking an *outward* motion, and moving the slider the *same* way. The passage-way is thus made clear for the wind from the grooves through the holes (*w*) in the upper-board into the pipes.

256. In the draw-stop action for small organs, wooden trundles are not usually employed, but iron squares are more frequently used.

The iron-trundle draw-stop action.

257. In the second or iron-trundle draw-stop action, (*fig.* 68), the trundle and the arms are formed of wrought

68



iron. The trundle itself (*a a*) stands at the edge of the sound-board (*b b b*), instead of underneath it, as in the former case, with its upper end (*c*) rather above the level of the bottom of the sound-board. There is no trace used, the bottom arm (*d*) being made much longer, that it may extend from the trundle to the draw-stop rod (*e*), and the top arm (*f*) is placed quite at the upper end of the trundle, from whence it gradually inclines upwards, until it reaches the slider (*h*), where it is finished off with a small bolt (*g*), that passes through the slider (*h*), and acts upon it.

258. When a sound-board is remotely situated, its draw-stop action is modified, and the trundles are sometimes placed horizontally, instead of perpendicularly; all such matters of detail being of course regulated by the nature of the situation to which the organ is being adapted.

259. The draw-stop action of the organ at the *Panopticon* is constructed on a principle entirely new to this country; the sliders being put in motion by small bellows.

CHAPTER XIV.

THE SHIFTING MOVEMENT, AND THE COMPOSITION PEDALS.

The shifting movement.

260. THERE are other means by which the sliders of the sound-board of an organ are brought under the control of the performer, besides those just described.

261. As early as Snetzler's time, if not before, means were devised for bringing some of the sliders of the great organ sound-board under the power of the *feet* of the performer; the object being to enable the organist to shut off the "chorus stops" without having to remove one or perhaps both of his hands from the manual. The contrivance alluded to was called a "shifting movement," and was put into operation by means of a pedal. On the depression of the pedal, the sliders governing the particular stops (usually all the flue stops of smaller size than the principal, and also the reed stops) were drawn in; and there they remained so long as the pedal continued down, which was kept in that position either by the foot, or by being *hitched* into a cutting in the case on one side of the pedal. On raising the foot, or releasing the pedal, as the case might be, the sliders were, by means of strong springs, restored to their former position. A great defect in the shifting movement, however, was, that in addition to the power necessary to set the machinery in motion, the resistance of the springs had to be overcome before the pedal would act, and this rendered its frequent use a matter of toil and some difficulty. Besides this, only one change in the combination of stops could be effected.

The composition pedals.

262. These drawbacks led to the invention of the *composition pedals;* a system of mechanism in which springs acting in the way just described are entirely done away with; and wherein the sliders are left to remain as the pedal arranges them, until the hand, or another pedal, effects a re-adjustment. The merit of this invention appears to be due to Mr. Bishop; though a claim to something of the same kind was made also by the late Mr. Flight.

263. Of composition pedals there are two kinds, the "single action" and the "double action."

The single-action composition pedal.

264. A single-action composition pedal operates in *one* way only; that is, it either *draws out* or *thrusts in* a given number of sliders, but does not do *both*.

265. For example, one composition-pedal of this kind will simply *draw out* stops, say Nos. 1, 2, and 3*; a second, stops Nos. 4, 5, and 6, and so on. But the first pedal will not *draw in* all the stops, *except* Nos. 1, 2, and 3: this, if done at all, must be accomplished by a third pedal. Some single-action composition pedals, therefore, only draw out stops; others merely draw some in.

The double-action composition pedal.

266. A double-action composition pedal performs *both* offices. It will either draw out all the stops *up* to a certain one; or it will draw in all *to* the same certain one. Or, supposing a combination to have been previously prepared, composed partly of stops below and partly above the number acted upon by a certain pedal—as, for instance, Nos. 1, 2, 5, and 6—on pressing down the composition pedal that throws out stops Nos. 1 to 3, the stop No. 3 will be *added* to Nos. 1 and 2, and Nos. 5 and 6 will be *drawn in*.

267. The full operation of the "double action" can be interestingly brought under observation in the following manner. If the mixtures and reeds *only* be drawn, and the pedal that acts on the great organ stops "to fifteenth" be pressed down, the stop handles that were previously in will all be thrown out, and those that were out will be drawn in.

268. To modern organs of moderate size there are usually 3, 4, or 5 double-action composition pedals, controlling the great organ stops; and sometimes there are also others which affect the swell and pedal stops.

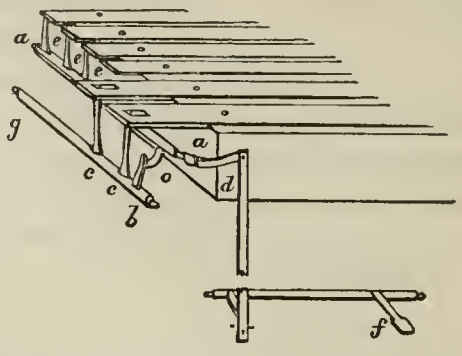
269. The second composition pedal is usually designed to prepare a *louder* combination than the first; and the third, if there are only three, generally brings into operation the remaining and most powerful stops.

270. The second one will therefore draw the sliders up to, say No. 6, if *fewer* are out; or it will draw *in* to that number, if *more* are out. The third will generally draw out all the remaining sliders, or such of them as may previously have been left undrawn; and so increase the tone of the great organ to its fullest power. Occasionally, indeed, the trumpet is not thus drawn, but is left to be added by the hand.

The composition pedal action.

271. Of the composition pedal action there are many varieties; almost every organ-builder having some plan which differs, either in principle altogether, or in some matter of detail, from that adopted by all the others. The kind of action represented in the following engraving, however, has been very generally used. It consists of two iron rods, or "composition irons," disposed horizontally (*a a b*, *fig.* 69), furnished with vertical iron arms (*c c e e e*); the whole of which are brought under control in the region of the manuals, through the aid of some simple mechanism, such as that indicated at *d f*.

69



* Instead of making use of the names of stops in this explanation, figures are employed; as it is thought the description will be rendered more clear by being divested of all technicality.

The way in which the action operates.

272. On pressing down the composition pedal (*f*), the horizontal arm (*d*), projecting from the first composition-iron (*a a*) is drawn downwards, partly turning the composition-iron on its axis. The upright arms at the end (*e e e*) are by this motion turned *inwards*, towards the sound-board, thrusting back the sliders with which they are brought into contact. The composition-irons are supposed to be placed at the *opposite* end of the sound-board to the draw-stop action; consequently their motion produces an effect the *reverse* of what they would do, were they placed at the *same* end of the sound-board. Thus, *thrusting in* the sliders at the one end is of course equivalent to *drawing them out* at the other. The first three sliders being thrust back, the draw-stops acting thereupon start forward, and the three stops governed by those draw-stops and sliders respectively are now ready for use.

273. As the *first* composition-iron revolves, the *contact* (*o*) strikes against the contact (*h*) belonging to the second composition-iron (*b*), and causes the second composition-iron to revolve the *contrary* way to the first. The arms (*c c*), being made to move only with the body, take also the contrary course, moving the other sliders with them; and thus is it that the "double action" is established, and the power secured of restoring any combination of stops to one particular form, by simply the pressure of the foot upon a pedal.

274. Every "double-action composition pedal" made upon this principle is provided with two of these composition irons, one for drawing off such sliders as the other does not draw on.

275. The composition pedals are usually placed immediately over the German pedals, in a row, and nearly parallel with the swell pedal; but occasionally they project through the jambs, as that of the swell often does, some on each side of the pedal-board.

276. Mr. Willis now constructs his composition appliances so that they may be worked with the fingers by the aid of pneumatic levers; and for which method of putting them into operation he has secured a patent. No pedals are used, but simply studs or buttons, which project through the beading under the great organ keys.

277. Mr. Hill has introduced into the Panopticon organ a most ingenious piece of mechanism, worked by a pedal, which draws out all the great organ stops, singly and in succession, producing thereby a gradual and complete crescendo; after doing which, it draws them in again, one by one, producing as complete a diminuendo.

278. In the modern French organs by Cavaillé Coll, and others, the composition pedals do not act upon the draw-stops, but upon the *wind*. For instance, if you put down the pedal to take off the reeds, it does not shift the sliders, but cuts off the communication of the wind from the reed sound-board, which of course effectually silences the stops.

279. In Germany, composition pedals are scarcely known; consequently the organs of that country are mostly without one of the greatest modern advantages. Batz, of Utrecht, is however beginning to introduce them.

280. In arranging the composition pedals, some of the English organ-builders place the "loud pedal" to the left and the softest to the right, while others reverse this order. The adoption of one uniform plan is most desirable.

CHAPTER XV.

THE ECHO AND SWELL.

231. Most of the old English organs originally possessed, and a few of them still retain, a department called the "echo."

232. The Echo organ consists of a duplication of the treble portion of some of the stops found on the other manual organs, closed in a wooden box, to render their tone soft and more distant-sounding than that of the stops of the same name in other parts of the instrument; planted on a small sound-board of their own, and provided with a separate half row of keys. The name of this now nearly obsolete department in English organs plainly indicates the purpose for which it was originally designed. In the year 1712, a most important improvement on the old echo was effected by Abraham Jordan, whereby the sound produced from its stops could be made to rise or fall on the ear with increasing or decreasing strength. This power was gained by making the front of the box that enclosed the pipes *open* instead of solid, as before, and furnishing it with a moveable shutter, fitting closely to and entirely covering the opening, and running up and down in a sash, like a window. A rope or lever attached to the shutter raised it, on the performer pressing down a pedal placed to his right and near to the ground, which action, gradually raising the sliding shutter, uncovered the opening in the box, and allowed the sound produced by the pipes within to emerge. The echo, in this greatly ameliorated form, was called the "swelling organ" or "swell," and rose so rapidly into repute, that the echo in its former primitive state fell into entire disuse in a very short space of time.

233. The "*nag's-head swell*," as the above early kind of swell was called, was not well designed, nor happily adapted to its purpose in a mechanical point of view. The weight or resistance to be overcome by the pressure of the foot was so great that the shutter could be set in motion only with difficulty; and when it was in motion, there was equal difficulty in regulating the rate or extent of its ascent; for it would then not unfrequently run up almost of itself. Its descent was similarly beyond control, and it would often fall with an audible noise. The nag's-head swell continued in use for upwards of half a century, till it was superseded by what has since been denominated the "Venetian swell." By whom this kind was invented is not positively known. It is not to be found among Green's *latest* work; but occurs constantly in the organs of England and Avery, one of whom no doubt was its originator.

234. The peculiarity of the *Venetian swell* consists in the front being composed of a series of "shades" or "shutters," measuring from six to ten inches in breadth,

and from one and a half to two and a half inches in thickness. Each shutter is hung on an axis placed one third from the top of its breadth. The edges of each shutter are bevelled away at an angle of about 45 degrees, so that the bevelled surfaces are parallel to each other, and each two contiguous boards are made to overlap each other, the bevelled surfaces meeting, so that the whole front may be quite flush or even when the shutters are closed. An arm projects a few inches from each shutter, in a line one above another, and these are all connected with a perpendicular rod, so that when the rod is raised, which is done by means of a pedal, all the shutters are opened. The bevelled surfaces of the shutters are covered with felt or some such substance, to make them fit closely and shut in the sound. Cloth and matting were for some time used as a lining to the box to deaden the sound when the swell was closed; but they exercised a similar influence also when it was open; besides which, the former material harboured moths, and the latter crumbled into dust, some of which found its way into the pipes. Brown paper, well coated with glue, covers the pores of the wood of the box, and so keeps in the sound when the shutters are closed, at the same time that it presents a hard surface to reflect the sound when they are open.

285. The resemblance which the shutters of a modern swell bear to Venetian window-blinds, readily suggested the designation by which they are now so generally known.

286. When the shutters of a swell are narrow, they are of course more numerous; and in such cases, when open, they present a greater number of thicknesses of wood to check the egress of the sound. On the other hand, when they are broader, and consequently fewer in number, they are more liable to "cast."

287. The swell-box and shutters are shown in profile in the general section. See *fig.* 4.

288. On a well-constructed Venetian swell, a practised performer can imitate, not only a gradual *crescendo* and *diminuendo*, but also a *sforzando;* a very small opening being sufficient to make an immediate burst on the ear, while, when the shutters are closed, a close imitation of an echo is produced. When the shutters are closed, they take that position either from their own weight, or from the influence of springs or weights.

289. In the lower part of the swell-box, in front, or at the back, or sometimes in both places, according to the plantation of the reed-stops, there is usually either a long moveable panel or a wooden flap, corresponding in length with the swell-shutters, behind which are ranged the pipes forming the reed stops, to the tuning of which access is thus easily gained.

290. Other facilities for tuning are usually provided, having special reference to the adjustment of the flue-stops. Those consist of large openings in each side of the swell-box, ordinarily closed by doors or panels. By removing these, the Tuner can reach the top of any flue-pipe that may require his attention.

291. Large swell sound-boards have frequently a centre passage-board, in which case there is an entrance door provided through the centre of the front of the swell, and the shutters are divided into two smaller sets.

292. A good Venetian swell, constructed on the ordinary principle, is capable of producing great effects of light and shade; yet attempts have been made from time to time to increase its contrasting powers.

293. One plan consisted in enclosing the original box in a second case, with a space of a few inches left between the two at the sides, back, and top, and filling the interstices with shavings, sawdust, or any other material that would prevent the escape of sound. In the front were placed two or even three sets of shutters, which did not all open simultaneously, although acted upon by one pedal, but, by a suitable arrangement of cranks and levers, on the gradual depression of the pedal, one set commenced its motion, then a second, and finally the third, each of the latter two with an accelerated pace, as compared with that of the one that preceded it; so that all three sets arrived at their extreme opening at the same moment, the shades falling into parallel lines, presenting scarcely any obstacle to the free escape of all the sound which the enclosed pipes were capable of producing. The box of the swell in the organ at St. James's Church, Bristol, built by Smith of that city in 1824, under the direction of Dr. Hodges, was constructed in the manner just detailed.

294. Another plan provided the *back* as well as the front of the swell-box with Venetian shutters, as was the case at the parish church, Doncaster; while the chief peculiarity in a third plan, devised for the same purpose, consisted in furnishing *both the sides* as well as the front of the box with shutters, as at York Cathedral. In this latter example the side shutters were made to work vertically. The shutters of the swell in the fine new organ recently erected in the church of St. Vincent de Paul in Paris, made by Cavaillé Coll, also work in the manner just mentioned. The swell-box in this instrument presents the peculiarity of having its sides and back provided with plate-glass panels, by which means, not only is a perfect view of what is within obtained from without, but the inside of the swell is nearly as free from darkness as the other interior parts of the organ.

295. A swell imparts to the sound of an organ an agreeable undulating effect, similar to that produced by the wind on the sound of a peal of bells when it bears their tones first *towards*, then *from* the listener. An organ with a swell is, in fact, as much in advance of an organ without one, so far as the power of giving expression to music is concerned, as a modern pianoforte is superior to the old harpsichord; on which account, it is rapidly finding admission into the organs of France and Germany.

296. The swell was held in special estimation by Samuel Green, who considerably increased its utility and efficiency, by extending its previously limited compass. Until his time, its range usually terminated at fiddle g or tenor f, sometimes even at middle c^1; but, in two of his organs, he extended the two former compasses by no less than a whole octave. The fine organs in which these evidences of Green's sound judgment are to be found, are those in St. Katherine's Church, Regent's Park, brought from the demolished structure of that name, near the Tower, and in the chapel of Greenwich Hospital; in the former of which the swell descends to gamut G, and in the latter, a tone lower, namely, to F F. Green originally enclosed even the great manual organ of his instrument in St. George's Chapel, Windsor, in a great swell.

297. Some of the old swell boxes were furnished with a wooden tube, not unlike a wind-trunk, projecting from the back of the box, and passing out into the tower of the church. This was the case with the organ at St. Martin's in the Fields, built by the elder Gray. The end of the tube attached to the swell-box was furnished

with a trap, which opened when the swell was closed, and closed as the swell was opened; by which means the subdued effect of the swell, when shut, was increased, on account of an outlet being thus afforded for the sound. This contrivance suggests a method of overcoming a difficulty with regard to the larger swells of modern organs. If the swell is much used without being opened, and the shutters fit accurately, the atmosphere within the swell-box becomes increased in density by the great quantity of wind that rapidly passes through the large pipes into the circumscribed area of the box, which has the effect of flattening the pitch of some of the pipes. If, on the other hand, a little leakage be allowed, the escaping air, by carrying some of the tone with it, renders the softened effect of the swell less perfect. By adapting a tube, as above, there would be free ventilation within the swell-box, when closed as well as when open, whereby the freedom of speech of the large as well as small pipes would be better secured; the pipes would not be thrown out of tune by being smothered; and the fullest contrasting powers of the swell would be preserved. If the swell were likely to be exposed to *two* temperatures—a second and lower one from the tower when the shutters were closed—this might be rectified by a small gas jet placed at a safe distance from the mouth of the tube. In his exhibition organ, Mr. Willis secured a free circulation of air by putting the swell bellows inside the swell-box.

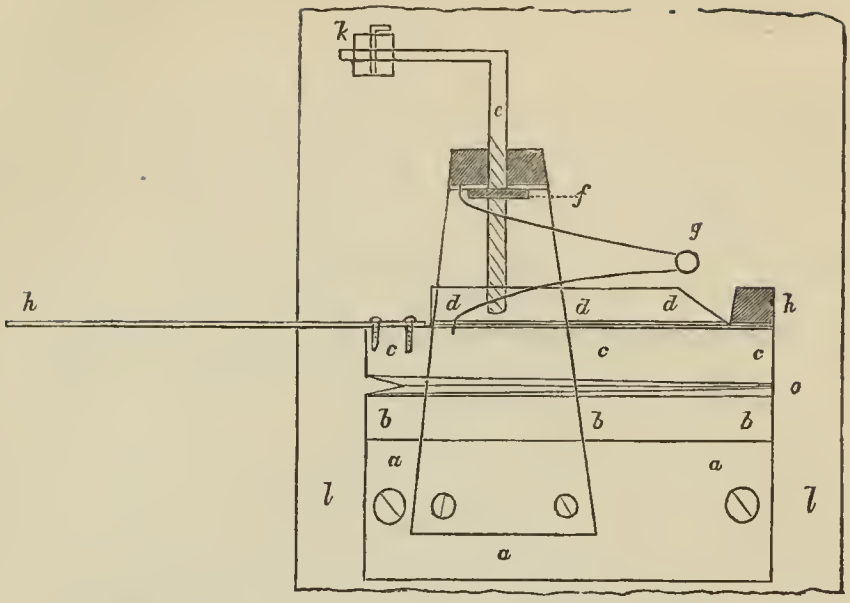
CHAPTER XVI.

THE TREMULANT.

298. THE tremulant is a small apparatus that gives to the tone of any department of an organ to which it may be applied a waving or undulating effect, resembling the *vibrato* in singing, and the *tremulando* in violin-playing. It has long been known in England by tradition, an appliance of the kind having formed a portion of the original work of Snetzler's organ in the Lutheran Church, at the Savoy, Strand. The old tremulants, however, were very noisy contrivances; hence they were not favorably received in this country, and they were latterly also omitted from most of the new organs in Germany. In Paris, a better kind of tremulant action was devised, not many years ago; on which, nevertheless, the English builders have succeeded in making considerable improvements; the first church organ in this country to which a tremulant of the new kind was applied, being that at St. Luke's, Old Street, the addition being made by Mr. Davison.

299. The accompanying engraving (*fig.* 70) represents one of the most successful tremulant actions. It is supposed to be fixed to one of the broad sides of the wind-trunk. The wind passes through a hole in the wind-trunk (*l l*), into the wind-box (*a a a*), and hence through an internal aperture in the slab (*b b b*), into the *tremulant* (*c c c*), which also has an aperture through it, covered by the pallet (*d d d*), held firmly down by the screw (*e*). The tremulant is thus set in motion. The rod (*k*) turns the screw half round in the socket (*f*), the pallet (*d d d*) being thereby raised slightly; the tremulant (*c c c*) immediately follows the pallet (*d*), by reason of the internal pressure of air on its under surface; but it is immediately thrown back by the spring (*g*), which, in power, just counterpoises the upward pressure of the tremulant (*c c c*). These two opposing forces, viz. the wind inside and the spring outside, impart a trembling motion to the tremulant, which motion is communicated to the bar (*h*). The rapidity and regularity of the vibrations depend upon the length and thickness of the vibrating bar, influenced, in some examples, by a small sliding weight at the end, on shifting which nearer to or farther from the tremulant, the vibrations are accelerated or retarded.

70



300. The tremulant is here described in connection with the swell, because that is the department to which it is the most usually attached in England; besides which, its effect is considerably enhanced when brought into conjunction with the numerous other resources of the division of the organ just named. The effects of *forte, piano, crescendo, diminuendo, sforzando,* and *tremulando,* are then all attainable from that one department alone.

301. The tremulant effect in an organ is of *older* date than the tremulando and vibrato effects in instrumental and vocal performance. This fact may be gathered from the following passage taken from Grassineau's Musical Dictionary, ed. 1740, p. 289.

302. "TREMOLO, *Tremolante,* or *Tremente,* 'tis not often used, except thus abbreviated—*Trem.* or *tr.*; to intimate to the *instrumental* performers of a piece, that they make several notes on the same degree or pitch of tune, with one draw of the bow, *to imitate the shaking on the organ.* Tho' this is often placed in the *vocal* parts of a song. We have examples of both in Mr. Lully's opera of Isis."

DIVISION V.

THE SOUND-PRODUCING PORTIONS OF THE ORGAN.

CHAPTER XVII.

THE MATERIALS USED FOR ORGAN-PIPES.

303. HAVING now described the wind-collecting and distributing portions, as also the mechanism of the organ, the next subject to be considered is the nature and construction of those parts from which the *tone* of the organ is more immediately produced.

304. The sound of an organ emanates from an assemblage of pipes, which are made either of tin, metal, or wood;—are round or square;—long or short;—broad or narrow;—according to circumstances. But first of the materials.

305. The various *substances* of which organ pipes are made, are tin; metal; lead; antimony metal; zinc; and wood of various kinds.

Tin.

306. Of all the materials just specified as being used for organ pipes, tin ranks first in point of excellence; and of the many existing varieties of this substance, that found in England is held in the highest esteem, not only by some of the organ-builders of this country, past and present, but also by the continental artists, by the latter of whom it still continues to be used in liberal quantities. Thus we find English tin mentioned as being used for a greater or less number of stops in the specifications numbered 11, 44, 45, 46, 48, 54, 55, 84, &c. in the accounts of foreign organs contained in the appendix to this book; while in other cases—Nos. 25, 34, 41, 42, 53, 65, and 74, for example,—other kinds of tin are named, as Prussian tin, probe tin, or simply "tin."

307. Tin has occasionally been used by English organ-builders for organ stops for many years past. Greenwood, of Leeds, introduced a dulciana of this material into the organ in Brereton Hall upwards of twenty-five years since: Mr. Hamilton, of Edinburgh, has employed it exclusively for the last ten years: and more recently it has been used by Mr. Davison for the great Open Diapason, and an interior stop in the Eton College Chapel organ (built 1852); also for the choir Open Diapason in

the Glasgow Town Hall organ (erected in 1853); and by Mr. Walker, for the Open Diapason and Dulciana in the organ at Holy Trinity Church, Vauxhall Bridge, finished in the year 1852.

308. Tin recommends itself as a material for organ pipes by its great durability, its superior silver colour, and its lightness. It is very ductile, on which account pipe-work made of such material does not nearly so soon become cracked or broken round the top by the force necessarily exercised with the tuning-horn during the process of tuning. Neither are pipes of this metal so soon attacked by the strong acid in the wood-work that sustains and supports them (the upper-boards and rack-boards),—but which will eat away the lower part of pipes made of many other materials that are more frequently used. It undergoes but little change, either from exposure to the atmosphere, or to the impure exhalation produced by the breathing of a closely packed audience; and it resists the influence of sulphurous vapours, such as the fumes from gas. Nor is it oxidised even by the combined action of air and moisture; on which last account, it has always been liberally used for the pipes of organs in those countries where there is a humid atmosphere, as in Holland; and the use of wood pipes at the same time avoided, as far as possible, on account of their tendency to swell from the damp. Of the sixty stops in the Haarlam organ (Foreign Specifications, No. 1), only one is of wood, namely, the pedal Sub-bass, and that is a subsequent insertion. The front pipes of that celebrated instrument, the largest of which is nearly forty feet in length, are of pure tin; while the inside pipes are made of metal compounded of half tin and half lead.

309. Tin, again, is less susceptible of change of temperature than are many of the compounds in common use, on account of its greater hardness; consequently pipes of this material stand much better in tune.

310. Tin does not soon become tarnished; hence its peculiar appropriateness for ungilded "front pipes," for which purpose it has indeed been used for centuries in even the humblest village church organs in Germany; and when it does at length become dulled, its splendour is easily recovered.

311. The lighter specific gravity of tin, again—fully one-third less than that of lead—is in its favor; a given quantity of the former going much farther than an equal weight of the latter. This is supposing the pipes to be made from sheets of the *same thickness;* but as this is but seldom the case—the 16-feet front pipes of the organ at St. Roque's Church, in Paris, however, forming an exception, they being of tin, and of remarkable *substance*,—the tin would probably go as far again as the lead. The great cost of tin—five or six times that of lead,—and more particularly the baneful "low-contract" spirit which unfortunately pervades most *modern* transactions in organ-building matters,—preclude its use to any great extent in this country; although it would, on account of the greater durability of the material, prove to be the cheapest in the end. The easy fusibility of tin renders the joining together of the edges of sheets of that metal a work demanding great care, as it is possible otherwise for the melted solder to fuse them instead of uniting them into a seam; hence a small portion of alloy (lead) is frequently added, which renders the substance less susceptible of heat. According to a late experiment, tin fuses at 442°, whereas lead requires 612° of Fahrenheit's thermometer. Cavaillé Coll, the eminent organ-builder of Paris, generally proportions 1-10th of lead to 9-10ths of tin; and Schulze, one of

the most excellent builders in Germany, uses 1-4th of lead to 3-4ths of tin; and for his ordinary metal, half tin and half lead. The two ingredients just named are said to form the hardest compound, when the proportions are 1-4th of lead to 3-4ths of tin.

312. Some German organ-builders draw a distinction, and a very good one, between "pure tin" and "tin." The term "pure tin" of course explains itself; but the material is still called "tin" so long as the proportion of alloy is so small as to *improve* the mass; and this is considered to be the case so long as the alloy forms no more than 1-4th of the total weight of the metal. Pipes composed of this material are said to produce the greatest amount of tone, combining brightness with fulness. When the pipes are of "pure tin," if they are also made of good substance and well blown, the tone has a tendency to become rather piercing; if, on the other hand, they are made thin and are less copiously winded, the sound will be very musical, though not so weighty as that from more solid pipes of the same scale made of the alloyed tin. Hence the latter material is preferred for the strongest-toned stops; and the former for others of a clear, cutting, crisp, or light intonation. Thus the Gambas, Salicets, &c. in Germany, and the choir Open Diapason and Dulciana of English organs, are not unfrequently made of "pure tin."

313. The original pipes of the Temple organ, made by Father Smith, are rather more than 3-4ths tin. The specific gravity of the metal of the last-mentioned organ is 7·9111 (that of water = 1); and its composition is as follows:

Tin	76·9504	per cent.
Lead	21·9017	,,
Copper....	·5183	,,
	99·3704	

314. The presence of copper, which is only about a half per cent., is no doubt accidental, and was in combination with the tin; a small quantity of copper being commonly found in ordinary commercial tin. The above composition very nearly accords with what would be called by the German organ-builders "12½ löthig metal," that is, one pound (= 16 löth) of the metal contains 12½ löth of tin, or 12½ oz. of tin to 3½ oz. of lead. The proportions of tin and lead, therefore, lie between 4 of tin and 1 of lead, and 3 of tin and 1 of lead, as above intimated.

315. In "Die Orgel," by Töpfer (Erfurt, 1843), page 175, a table is given of the specific gravity of metal with different proportions of tin and lead, from which it appears that the specific gravity of that consisting of 4 of tin and 1 of lead is 7·8830, and that containing 3 of tin and 1 of lead is 8·0380; the specific gravity of the Temple metal being *between* the two, namely, 7·9111. The front pipes of the organs at St. Paul's Cathedral and Trinity College Chapel, Cambridge, are also of very fine metal, and of considerable thickness; hence the rich and resonant character of the Diapasons of all the instruments above named.

Metal.

316. Metal is a word used technically by organ-builders; and is understood to signify a mixture of tin and lead, which compound is valued according to the quantity of the former ingredient contained in its composition. The metal ordinarily used abroad consists of ½ tin and ½ lead. The distinction between

tin and metal stops, as well as the proportion of tin and lead used in the composition of the metal, will be found interestingly illustrated in Specifications of Foreign Organs, Nos. 65, 74, 88, 89, 91, 92, &c.

Spotted Metal.

317. There is a compound now much used in England, and held in high repute, called "spotted metal," from its surface being mottled or covered with spots. The spots gradually appear on the surface as the metal cools after being cast into sheets, and "rise" when the ingredients contain about $\frac{1}{3}$ of tin. They are, therefore, generally viewed as an evidence of the goodness of the material. Spotted metal was frequently made use of by the younger Harris and Green, also by Lincoln. In the present day, it is constantly used by Walker, &c.

Lead.

318. Lead, either alone or with but a slight admixture of tin, from its inability to sustain itself for any lengthened period, is, as a material for metal organ pipes, comparatively worthless. The greater thickness to which a sheet of this metal must necessarily be made, to compensate for its natural softness, added to its greater specific gravity, are circumstances that render the bodies of leaden flue pipes so heavy that their feet are very liable to become depressed at the apex from the weight, and the language to sink, whereby the intonation of the pipe is endangered, if not lost. The tubes of reed-pipes, especially, are very apt to bend at the narrow end or stork, from this weakness. Bad metal is discernable in a variety of ways; to the eye, by its dark blue tint*; to the touch, by its producing a dull hollow sound on being rapped, whereas pipes of good thick metal produce a clear ringing sound; and to the nail, by its being easily scratched, whereas tin can scarcely be marked in that manner. Metal, composed chiefly of lead, also easily soils paper on which it is rubbed. The organ in the Minoreten Church at Bonn—the instrument on which Beethoven used to play—has its metal pipe-work composed entirely of lead, including the 16-feet front. It is not a good instrument.

Antimony Metal.

319. Antimony metal is compounded chiefly of lead and antimony, or lead and type. The antimony imparts considerable hardness to the mass; so that the possibility need scarcely exist of a pipe-foot or language of antimony metal sinking. The drawback is its brittleness; pipe-work of this compound being very liable to crack round the top after being subjected to the action of the tuning-horn for a few years. A proof of this lack of tenacity in the metal in question is obtained by bending a piece of it to and fro, when it will be found to break asunder on reversing the bend. In some instances the antimony has been known to separate itself from the lead, leaving the pipes covered with little indentations; and reed-pipes of antimony metal have been known to snap off suddenly at the stork, and fall from their situations.

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* "In the continental organs, the pipes visible in front of the case are carefully finished and burnished, and show the bright natural lustre of the white metal; but, in England, where the ignoble alloy is incapable of retaining its polish, the pipes are obliged to be gilt or painted, to make them appear respectable."—*Musical Instruments in the Great Exhibition, by Wm. Pole*, page 49.

Zinc.

320. Zinc has occasionally been used for the structure of large metal pipes; and it is a metal that undergoes but little alteration at common temperatures, under even the combined influences of air and moisture. The tone produced from pipes of this material is somewhat lighter than that of tin or metal pipes of the same nature. Its cost, however,—scarcely a tithe of that of good metal,—much favors its introduction. Thus the tubes of the 32 and 16 feet reed stops in many of the continental organs are made of this material. The 32-feet Posaun on the pedal at St. Roque's, at Paris, is of zinc; so also is the 16-feet Bombarde in the organ at St. Martin's, Liege. The front Double Open Diapason (32 feet) in the Birmingham Town-Hall organ is likewise of the same material; and there is a Double Open Diapason of the same size and metal also in the Cathedral organ at York.

The casting of the metal.

321. In order to prepare the metal for use, of which organ pipes are to be formed, the ingredients are melted together in a copper, and then cast into *sheets;* a process effected by pouring it, in a molten state, into a wooden trough, and running the trough rapidly along a bench faced with *tick*. The metal escapes from the trough through a narrow horizontal cutting at the back, leaving a layer of metal behind it as it proceeds; and the wider the cutting is, of course the thicker will be the sheet of metal produced. After being cast to an *approximate* thickness, the metal is planed down to the precise thickness required. It is then cut into portions of the shape necessary to give to the pipes the required size and form, and is thus finally worked up.

Wood.

322. A great number of the large pipes, as well as some of the smaller, are made of wood; and experience proves that pipes made of good wood do better service, and are of longer duration, than inferior metal ones.

323. Dr. Burney was assured by Snetzler, who had seen Father Smith work, that he was so particularly careful in the choice of his wood, as never to use any that had the least flaw or knot in it; and so tender was he of his reputation, that he would never waste time in trying to mend a bad pipe, but would immediately throw it away and make another, which accounts for the soundness of his wood pipes to this day. The woods chiefly made use of for modern pipes are cedar, deal, and pine. Oak was employed by Father Smith, but not frequently, in consequence of its cost, and the expense of working it. The Stopped Diapason in the choir organ, throughout, and the bass of that in the great organ at the Temple, are however of this material. So also is the Flute in the great organ. Mahogany is occasionally adopted for the pipes of organs destined for hot climates, as in the organ at Calcutta Cathedral, built by the late Mr. Gray. Other woods are sometimes made use of in Continental organs, as maple-wood, pear-tree-wood, cypress-wood, box-wood, &c.—See *Foreign Specifications*, Nos. 53, 57, 59, 74, 86, 89, &c.

The seasoning of the wood.

324. The wood of which organ-pipes are to be made is first well seasoned; that is to say, it is thoroughly exposed to the air for a few years,—and, to a certain extent, also to the rain water,—to destroy all its vital properties; after which it is kept in a dry place, where the air can get to it freely, to prevent its decaying. If any sap were to remain in the timber—i. e. if the

wood were not to be thoroughly seasoned—it would be very apt, after being worked up into pipes, to split on becoming dry, and so render the intonation faulty.

325. With the view to rendering the wood pipe-work thoroughly sound, such knots in the timber as cannot be avoided are covered well with glue and leather, or paper, to prevent their falling out; or they are extracted, and their places filled in with other wood. After this, the wood pipes are often covered on the outside with a coat of red size (which by no means improves the appearance of the interior of the organ), and inside with a layer of thin glue, to fill up the pores of the wood, which, by rendering the surface smooth, improves the tone of the pipes.

CHAPTER XVIII.

THE PLAN, OUTLINE, AND STRUCTURE OF ORGAN-PIPES.

The plan and outline of the pipes.

326. THE next particulars to be noticed are the *plan*, *outline*, and *proportions* of the pipes that are formed out of the several materials just enumerated.

327. In regard to *plan*, organ-pipes are divided into two classes—*round* and *four-sided;* the two kinds of plan necessarily arising from the employment of the flexible and the stiff substances.

328. In regard to *shape* and *outline*, organ-pipes are very diversified; and every variation in these respects causes some alteration in the *strength* or *character of the tone* of the pipe.

329. The chief varieties of round-bodied pipes are the

Cylindrical,
Conical,
Conical, surmounted by a bell,
Inverted cone, and
Inverted cone, surmounted by a bell.

330. Wood pipes are divided into

Four-sided,
Pyramidal, and
Inverted pyramidal pipes.

Cylindrical pipes.

331. Pipes classed under this head are such round ones as preserve the same diameter in body all the way up. There are three varieties of cylindrical pipes—the open; the stopped; and the half-stopped.

Open cylindrical pipes (*fig.* 71, page 79).

332. Open cylindrical pipes are the most numerous in all organs; the stops called Open Diapason, Principal, Fifteenth, and Mixture, among others, being ordinarily composed of pipes of this shape. Open cylindrical pipes are therefore used for the strong-toned flue stops.

Stopped cylindrical pipes (*fig.* 72, page 79).

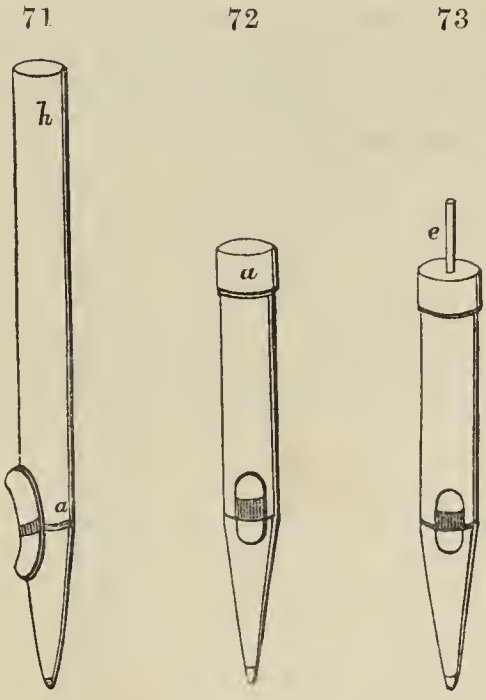
333. Stopped cylindrical pipes are such as have their top closed or covered in by a metal covering or cap (*a*, *fig.* 72). Stops composed of pipes so formed are rarely to be met with in England, except in old organs; and there they are only occasionally to be seen. The pretty (so-labelled) Stopped Diapason in the swell of the small organ in All-Hallows,

Bread Street, is formed of pipes of this description. Stops of covered pipes, however, are of common occurrence in the German organs, under the names of "Gedact" and "Quintaton."

334. The "Gedact 8 fusston," which is sometimes made also of wood, is a soft, mellow-toned Stopped Diapason. The "Quintaton 8 fusston" is a Stopped Diapason of small scale, which sounds an harmonic as well as the fundamental or ground-tone.

Half-stopped cylindrical pipes (*fig.* 73).

335. Half-stopped cylindrical pipes are far more common in English organs than are the last mentioned. They are formed much after the manner of the covered pipes just noticed, the chief difference consisting in the cap being perforated in the centre with a small tube or chimney rising therefrom, and hence called *flute à cheminée* by the French. (See *e*, *fig.* 73.) Stops of this kind are frequently to be seen in old organs, and occasionally also in modern ones, under the names Stopped Diapason (metal), Flute (metal), &c.; although the stop-labels seldom indicate their presence, so far as the *material* is concerned.



336. The great Stopped Diapason and choir Flute in the organ at the Temple Church are of metal; so were those in Harris's fine organ at Doncaster, destroyed in 1853. There is a fine metal Stopped Diapason in Bridge's great organ at Christ Church, Spitalfields.

Perforated cylindrical pipes.

337. Perforated cylindrical pipes are used in the formation of certain stops. Thus the small pipes of the Keraulophon are pierced through the body, near to the top; those of the English Hohlflute have two holes near to the top, and opposite to each other; while those of the Flute Harmonique have each a perforation about half way up the body.

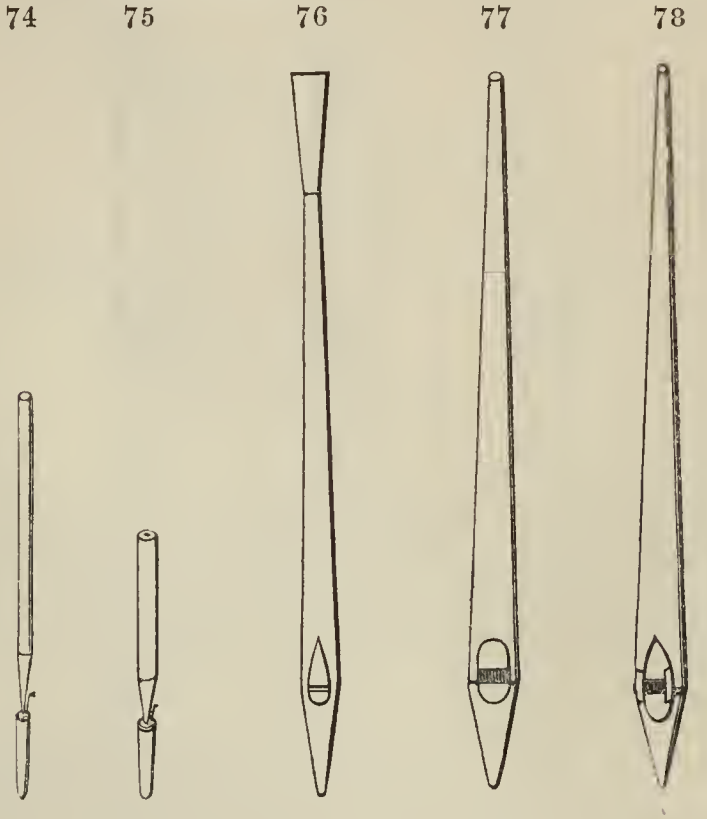
338. Besides the foregoing varieties, cylindrical pipes are made of *wood* in Germany, and produce a most exquisite tone. They are chiefly used for the "Flauto

Traverso," which stop, like the French Flute Harmonique, blows its octave in the upper portion of the scale.

339. Besides the flue stops already enumerated, some soft-toned reed stops are composed of cylindrical pipes. These are the Clarionet (*fig.* 74) and Vox Humana (*fig.* 75) stops. The former is formed of moderately long and narrow pipes, which are quite open at the top; the last-mentioned are of shorter and broader pipes, and half-stopped at the top.

Conical pipes.

340. Conical pipes are such of which the bodies lessen from the mouth upwards more or less rapidly. Pipes of this conical shape are neither common nor particularly rare in English organs. They are, however, not very readily traced even when they do occur, as their presence is seldom notified in any way on the stop-handles. Two varieties of conical pipes are here engraved. *Fig.* 77 represents the German "Spitz-flöte," which is little more than half the width at the top; and *fig.* 78 the German "Gemshorn," which is scarcely more than $\frac{1}{3}$ at the top that it is at the mouth. Father Smith occasionally made use of conical pipes. The Principal and Fifteenth (so called) in the choir organ of the instrument at the Temple Church, and the choir Twelfth at St. Paul's Cathedral, are composed of pipes of this shape; the former of the two at the Temple taking the outline of the form here numbered 77, and the latter that of 78.



341. Stops of similar shape, labelled "Gamba 8 feet," and "Gemshorn 4 feet," occur in the choir organ of the fine instrument erected in the Wesleyan Chapel, Poplar, in 1848, by Mr. Hill; and in the same division of the organ at the Panopticon, also by the same builder.

Conical pipes, surmounted by a bell or outspreading top (*fig.* 76, page 80).

342. Conical pipes, surmounted by a bell, are used in the formation of the English Viol di Gamba; the pipes of which stop, however; differ from those of the German one of the same name, in having the bell at the top, besides being conical. This kind of pipe is peculiar to the English organ, and was first introduced by Mr. Hill.

Inverted cone (*fig.* 79).

343. Pipes of the inverted conical form, i. e. narrow at the lower extremity, and spreading out thence upwards (see *fig.* 79), are employed to a great extent in most organs; the greater portion of the reed-stops, as Trumpet, Clarion, Horn, &c. being composed of pipes partaking of this outline; the chief difference perceivable to the eye being in the proportion. Flue pipes are made of this shape on the continent, and form the stop called the "Dolcan" (*fig.* 80). A stop of this shape and name occurs in the organ at St. Stephen's Church, Westminster, built by Mr. Hill, producing a light, agreeable, and rather fluty tone.

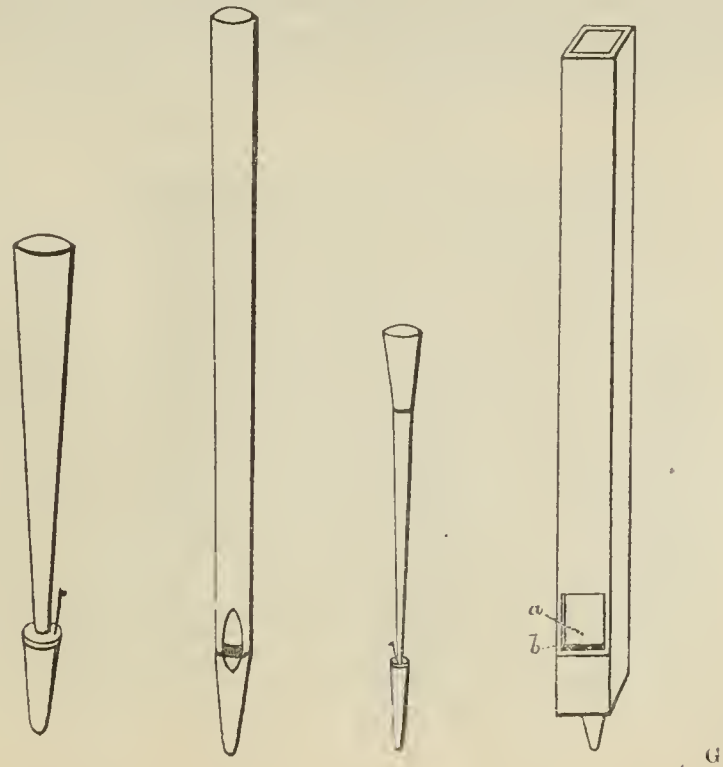
Inverted cone, surmounted by a bell (*fig.* 81).

344. Pipes of the shape of an inverted cone, surmounted by a bell, increase in diameter more gradually and to a less extent than the preceding; the bell expanding more suddenly. Pipes of this construction (*fig.* 81) are only used in the formation of the Hautboy and its octave; the pipes of which stops more nearly resemble the shape of their orchestral prototype, than those of any other in the organ, excepting some of the continental Flutes.

Wooden pipes.

345. *Four-sided pipes* (*fig.* 82) are those of which the bodies are of the same width and depth throughout. They are freely employed in most organs, and are of two kinds; the first open, the second stopped, entirely or partially.

79 80 81 82



Open four-sided pipes.

346. Open four-sided pipes are often introduced in lieu of the large metal bass ones of the Dulciana and Open Diapason. Some stops are formed exclusively of pipes of this class; as the Claribella, Open wood Flute, &c. The Pedal Open Diapason is very commonly composed of pipes of the above kind.

Stopped four-sided pipes (*fig.* 83).

347. Stopped four-sided pipes are closed in at the upper end with a *stopper*. Like the preceding, they are used to a great extent in most organs; the Double and Unison Stopped Diapasons, and the Stopped Flute, being in modern instruments usually composed of pipes of this description.

Half-stopped four-sided pipes.

348. The difference between a stopped and a half-stopped pipe consists in the latter having a hole bored down through the handle and stopper. The treble portion of the stops mentioned under the last head is frequently perforated in this manner; so also is the Clarinet-flute. Large stopped pipes are seldom bored.

Pyramidal pipes (*fig.* 84).

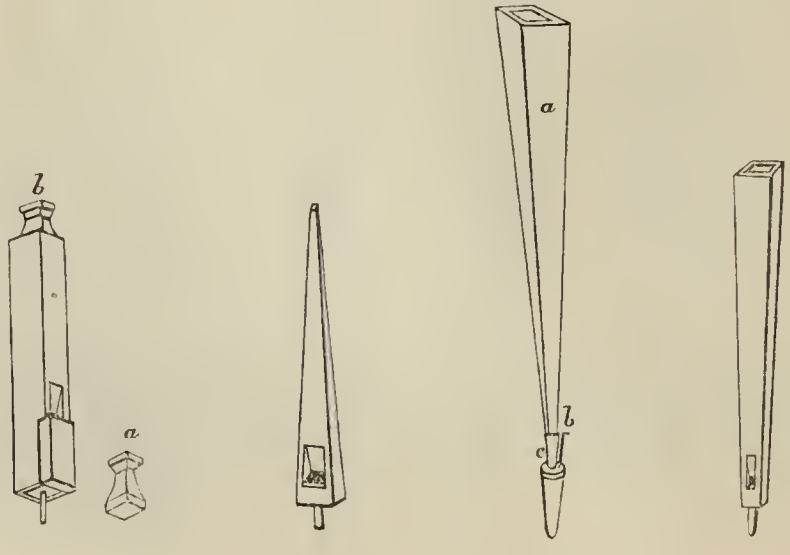
349. Pyramidal pipes, broadest at the mouth and lessening upwards, are sometimes introduced (*fig.* 84) to form the bass of the metal conical stops, in the same way that the open four-sided pipes are employed for the completion of some of the cylindrical stops. Occasionally entire stops are formed of pipes of this shape.

350. In the choir department of the large organ in the Wesleyan chapel at Boston, built by Messrs. Gray and Davison, are two stops made of this shape, and called "Gamba" and "Gemshorn."

Pyramidal and inverted (*fig.* 85).

351. Pipes of the inverted pyramidal shape, i. e. narrow at the bottom and broad at the top (*fig.* 85), are frequently used for large reed-stops, as the 16 and 32 feet Posauns. Smaller reed-stops are sometimes formed of pipes of this description; as, for instance, the Bassoon. The pipes constituting the lower portion of the "Dolcan" (*fig.* 86) are also sometimes made of the pyramidal and inverted shape.

83 84 85 86



352. The varied *proportion* in the dimensions of a pipe, and its influence on the second, are noticed in a subsequent page.

The classification of the pipes into *flue* and *reed* pipes.

353. The numerous kinds of pipes just noticed are divided, in regard to the distinct manner in which that part is made which in reality produces the tone, into two great classes, namely, *flue-pipes* and *reed-pipes*.

Flue pipes.

354. Lip, mouth, or flue pipes,—for they are called by all these names,—are such as have an oblong opening, called the *mouth*, at the junction of the body with the foot of the pipe; bounded above and below by two edges called the *lips;* which are made to sound by the wind first passing through a narrow fissure, *flue, or wind-way;* and which depend chiefly on the length or shortness of their *bodies*, for the gravity or acuteness of the sound they produce.

Reed pipes.

355. Reed or tongue pipes are, on the contrary, those which are made to sound through the medium of a mouth-piece (not unlike that of a Clarionet), furnished with an elastic plate of metal; and which do *not* depend on the length of the tube* of the pipe, but on the size of the mouthpiece and the vibrations of the *tongue*, for the gravity or acuteness of the sound.

356. For the purpose of illustrating the difference between these two classes of pipes, it may be observed, that, while an open flue pipe must have a body of eight-feet standard length to produce the CC sound, a reed pipe may only require a tube of about eighteen inches, as in the case of a Vox Humana. Indeed, a tube of any sort is not indispensable, as is evidenced in Accordions, Seraphines, Harmoniums, Concertinas, and such like instruments; all of which produce their sounds from metal tongues of various sizes, closely resembling those belonging to the reed-pipes of an organ; but the dimensions of which instruments must be sufficient to indicate that tubes cannot therein be contained. The tubes, however, exercise a great influence on the strength and fulness of the tone produced; both being much increased by their presence.

The separate parts of a metal flue pipe.

357. An open metal flue pipe is composed of three distinct parts, called the *body*, *foot*, and *language* or *languid*.

358. *The body* is that part of the pipe that, commencing at the mouth, extends thence *upwards*. (See *fig.* 71, *g*, *h*, page 79.) It is formed by rolling a sheet of metal, of the requisite dimensions, round a wooden cylinder or cone, called a "mandrill," and uniting the edges together with solder. The joint thus formed is called a "seam," and occurs in the back of the pipe. On the opposite side, forming the front of the body, and near to the lower end, an indentation is made, as shown in *fig.* 87, at *a*, called the "leaf," which is continued to nearly the bottom, where a small portion of the flattened part is cut away, leaving a broad opening, *b*. The edge that is left immediately over this opening (*c*) is called the "upper-lip."

87

* Flue-pipes are said to have *bodies*, and reed-pipes *tubes*.

359. *The foot* is that part of the pipe, of an inverted conical shape, that extends from the mouth downwards (*fig.* 38). It is made in a similar manner to the body; i. e. it has a seam running vertically up the centre of the back, and an indentation in the front; though, in this instance, in the upper part (*a*), corresponding with that in the body of the pipe, forming an "under-lip." The foot serves as a conductor of wind from the upper-board up to the mouth of the pipe; hence, in the apex (*e*) a hole is made for the entrance of the wind. It further answers as a support to the pipe; to which end it is made very thick and strong, that it may resist the weight and pressure of the body.

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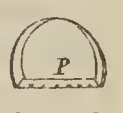
360. *The language*, or *languid* (*fig.* 89), is the flat plate of metal that lies horizontally over the top of the foot, just inside the mouth. It is made of much thicker material than any other part of the pipe, because it is entirely unsupported, except at the sides and back. In front, it presents a straight edge, corresponding with the lips of the body and foot, but slightly behind that of the latter, leaving a narrow fissure or "wind-way" between. The front is also bevelled, inwards and upwards. The *language* is made very strong and thick, that it might not sink in front or in the middle—casualties that would cause the "sheet of wind" to miss the upper-lip, and so render the speech of the pipe defective.

89



361. *The mouth*, as already intimated, is the horizontal cutting or opening that occurs at the junction of the body and foot of the pipe. Its use and influence will be noticed hereafter.

The way in which the several parts of metal pipes are united together.

362. *Open metal pipes.*—The separate parts of an open flue pipe are joined together in the following manner. The straight edges of the language and foot are first arranged parallel, and then the back and sides of the two are soldered together; the narrow slit in front being left open so as to form a passage or "wind-way" for the current of air that enters at the foot of the pipe. In the next place, the lips of the body and foot are placed precisely opposite to each other, and the body and foot are thus strongly united together at the back and sides. The language is thus entirely enclosed within a finished pipe.

363. *Stopped metal pipes* are either furnished with a moveable cap, that fits tightly over the top of the pipe, completely enclosing it, or a metal cap is soldered on to the top of the body.

364. *Half-stopped metal pipes* have, in addition to the cap, or the fixed covering, a small cylindrical tube, or "chimney," soldered into a hole in its centre, which tube imparts a little more freedom and strength to the tone.

365. It may be as well to explain here the precise meaning of the German name given to a stop composed of pipes of the kind just noticed. The literal translation of the German name Rohr-flöte is reed-flute; which has sometimes been supposed to imply a reedy-*toned* flute stop; such interpretation, however, being accompanied by a difficulty arising from the fact, that half-stopped metal pipes, with chimneys, produce a peculiarly smooth and liquid tone. The name really refers to the formation of the pipe, not to the character of its tone; and signifies that the dis-

tinguishing feature of the pipe is a small tube resembling the hollow-stalk that grows in wet grounds, and which all English dictionaries describe as a *reed* (rohr). Rohr-flöte therefore simply means a stop belonging to the *flute*-work, the pipes of which are furnished with a tube or *reed*. Furthermore, *reed*-pipes are always so called in England, from the circumstance of their being provided with a small metal tube by way of mouthpiece.

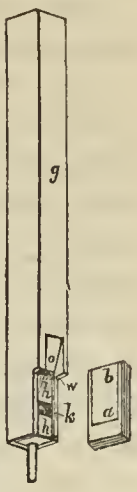
366. The three kinds of metal flue-pipes are frequently furnished with *ears*, i. e. pieces of metal projecting from each side of the mouth. In stopped and half-stopped pipes the ears are large; but in open ones they are smaller and more neat, giving to the front-pipes, which are always furnished with them, a finished appearance.

Wood flue pipes; open, stopped, and half-stopped.

367. An open *wood* pipe is formed of four separate parts; namely, the body, block, cap, and foot.

368. *The body* (*g*, *fig.* 90) consists of a right-angled tube, formed of four planed boards; the cross section of which is not usually a square, but an oblong. At the lower end, the body is closed by the block (*h h*), which is nearly divided in two by a deep cutting, called the *throat* (*k*). The block and throat are closed in front by the *cap* (*b a*)—a piece of hard wood, hollowed out (*n*)—leaving the two sides and the bottom edges to be glued or screwed to the sides and block of the pipe. The upper edge (*b*) of the cap recedes a little, to form the wind-way. *The pipe-foot* (*m*) is a cylindrical or four-sided tube, introduced at the bottom of the pipe, to serve as a conductor of the wind into the pipe, and also as a support thereto.

90



369. In wooden stopped and half-stopped pipes, the stopper is well covered with leather at the bottom and sides, to make the stopping quite sound. Were it not so, the tone would be false.

91

370. The proportion of the breadth, as compared with the depth, of wood stopped pipes is varied very much, according to the quality of tone that is desired to be produced. Father Smith and Bridge frequently made their stopped pipes nearly square; the former sometimes making the proportions of the block of his C C Stopped Diapason 5 inches by $4\frac{3}{4}$. The German builders make some of their wood pipes narrow and deep, as in the Lieblich Gedact, the C C C pipe of which measures 5 inches by $3\frac{3}{8}$; while those for other stops are made wider than they are deep, as in the Hohl-flote, shown in *fig.* 91, the tenor c pipe of which is made $1\frac{3}{16}$ deep and $2\frac{7}{16}$ wide. A pipe that is nearly square gives a full and weighty tone; one that is narrow and deep, a soft and sweet *(Lieblich)* tone; and one that is shallow and wide, a powerful and hollow *(Hohl)* tone. Father Smith made his Hohl-flute perfectly square, the block of the 2-feet pipe measuring exactly 1 inch in depth and width; and when placed on the same manual with a Stopped Diapason, he then made the latter narrow and deep, i. e. of the Lieblich Gedact shape, by which means he secured great indivi-

duality in the tone of the two stops. An interesting illustration of this arrangement of scales will be found in the charming choir organ in the Cathedral at Manchester.

How the several parts are worked together.

371. In working together the separate parts of an open wood flue pipe, the sides are first glued and nailed, or pinned, to the block; and when the glue has thoroughly "set," the back and front are attached to the edges of the sides by similar means. The pipe-foot is then glued in; and when the pipe is voiced, the cap is fastened on.

372. *The mouth of a wood flue pipe* is formed by discontinuing the front of the body of the pipe just above the block, as shown at *w*, in *fig.* 90, and bevelling off the front of the surface just above, downwards and inwards (*i*), till an edge is produced, called the upper-lip. Just below this, leaving however an opening of sufficient depth to form the mouth, is the upper edge of the cap, which constitutes the under-lip of the mouth.

373. There are certain modifications sometimes effected in the manner of making the mouth of wood pipes that may here be noticed.

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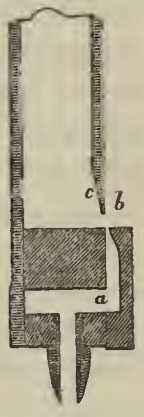


374. *Block pipes* occasionally have their mouths *inverted* (see *fig.* 92). In such cases, the front of the block (*a*) is made to project as far as the *outer* surface of the front of the pipe (*b*), instead of being only in a line with the inner one, as in the case of block pipes of the usual kind; and the bevelled part that forms the upper-lip (*c*) is cut on the *inner* surface of the front of the pipe, instead of outside the exterior, then presenting an unbroken appearance, as though there were no lip at all. The arrangement of the mouth, in fact, as compared with that of simply block pipes, is precisely reversed. The English Wald-flute of 4 feet, and sometimes the Clarabella, and even larger stops, are composed of block pipes with inverted mouths.

375. *Languid Wood Pipes* are sometimes made, the peculiarity in which is sufficiently indicated by the term employed for distinguishing such from the other varieties of pipe; namely, that instead of a wooden block, it is simply furnished with a plate or languid of wood, as shown in the accompanying section. Large wood pipes are often made on this principle.

93

376. *The double-mouthed pipe* is but seldom seen in England. Its name is a key to the peculiarity observable in the nature of its formation, namely, that of having *two* mouths instead of one; and the mouths are placed opposite to each other. Greater strength of tone is said to be produced from pipes with two mouths. The German Doppel-flöte is composed of pipes so formed.

377. The G G G Open Pedal-pipe introduced into the Westminster Abbey organ by Elliott and Hill, in Dr. Cooke's time, had two mouths, and was also of the pyramidal form. Its situation in the organ case, however, was a confined one, consequently it was never heard to advantage; and when the pedal pipes were afterwards laid horizontally in a pile on the screen, as its outline was inconvenient for its new position, it was removed and another pipe substituted.

378. The only difference between an open and stopped wood pipe consists in the latter being closed at the top (*b*, *fig.* 83) by a plug or stopper, illustrated at *a* in the same figure. A half-stopped wood pipe has a hole drilled down the stopper.

379. Wooden flue pipes are sometimes furnished with ears on each side the mouth, and occasionally also with a cross piece fastened on immediately beneath the under-lip, called a beard. Ears and beards are chiefly supplied to such pipes as are too slow in their articulation. These additions, by keeping the wind together, accelerates the speech of the pipe.

Origin and continuance of the tone in flue pipes.

380. Something may now be said concerning the speech of flue pipes. A *metal* flue pipe is made to sound by the admission of a jet of wind at the apex of the foot, which, rushing upwards, passes through the wind-way and strikes against the upper-lip, producing a concussion which prevents the air from issuing in a continuous manner from the mouth, and causes it to proceed intermittingly. The vibrations thus caused are communicated to the column of air within the body of the pipe; and the air being set in motion, a sound is produced; which sound, however, cannot strictly be said to be produced by the pipe itself, nor by the elastic motion of its body, but by the vibrations at its mouth, and the motion of the column of air contained within its body. The former circumstance is sufficiently evidenced by the fact that the pitch is nearly the same, whatever may be the thickness or the character of the material employed in the construction of the pipe. The stoutness, toughness, and elasticity of the material, have, nevertheless, something to do with the *quality* and *strength* of the tone, as will presently be explained. A slight motion of the body of the pipe may indeed be detected; which, however, is a consequence and not a cause; and arises from the friction of the column of air within, having nothing to do with the *production* of the sound, which is to be attributed solely to the circumstances already mentioned.

381. A *wood* flue pipe is made to sound in much the same manner as a metal pipe of the same kind. The wind, on being admitted, passes up the pipe-foot into the throat, and from thence into the hollowed part of the cap, up which it forces itself; then, after passing through the wind-way between the upper edge of the cap and block, it strikes against the upper-lip, and is thus made to vibrate, the vibrations, as already described, being communicated to the air in the body of the pipe.

382. It is worthy of remark, that, whereas the sides of a wood pipe beat violently while the pipe is speaking, the front and back remain perfectly quiescent.

383. The sound from a pipe continues so long as the organ-wind is allowed to enter that pipe, and at the same unabated strength.

384. In a Stopped pipe the current of air in the body of the pipe takes a somewhat altered course, and produces a remarkably different result from what it does in an Open one.

385. The consideration of this subject affords an opportunity for explaining what might otherwise appear to be an inaccuracy in regard to flue pipes depending on the dimensions of their bodies for the gravity or acuteness of their sound. A stopped flue pipe of a given length will produce a sound as low as that of an open pipe of *twice the length*. This fact, however, is soon accounted for. Instead of the

air escaping out at the top of the shorter pipe, as it does out of the longer, it is checked by the stopper that closes the upper end. In consequence of this interruption, the wind is reflected back again down the pipe before it can make its exit, which it does through the mouth. The wind in a stopped pipe, therefore, traverses the distance of the length of the body twice over—first up, then down—and consequently produces a sound of increased gravity in proportion. Thus, a stopped pipe of 2 feet gives the same sound as an open one of 4 feet; a stopped pipe of 8 feet the same sound as an open one of 16 feet; and so on.

The mouth of a flue pipe; and the influence of its proportions on the tone of the pipe.

386. The size and proportions of the mouth of a *metal* flue pipe exercise great influence on the strength, character, and quality of the tone of the pipe. The usual proportions, which, however, are subject to considerable modification, are, for the width, $\frac{1}{4}$ the circumference of the body, and $\frac{1}{16}$ of the same measure for the height. According to this rule, therefore, the mouth of a pipe that is 16 inches in circumference inside—or, what is the same thing, $5\frac{1}{3}$ inches in diameter, the diameter being about $\frac{1}{3}$ of the circumference—would be 4 inches in width and 1 inch in height. Some organ pipes have a wide mouth, others a narrow one; some have a high mouth, and some a low one. A wide and high mouth produces a round, powerful tone; a narrow one, a sharper tone; a narrow and low mouth, a delicate tone; and a wide and higher mouth, a less clear and hollow tone. But even these deviations have their assigned limits; for, if the upper-lip be cut up too high, the pipe will be slow to speak, or will not speak at all; and if the mouth be too narrow, the pipe will speak the octave above its real sound.

The voicing of metal and wood flue pipes.

387. The careful conformation of the mouth of the pipe; setting the lips; regulating the quantity of wind to be admitted; conducting it through the wind-way in a sheet of the precise thickness; and carrying out other such details necessary to secure the true tone—character and speech of the pipe, are matters of great delicacy; demanding the nicest skill as well as a just perception of tone on the part of the operator. These and other duties are included under the one general term *voicing;* and some idea will be formed of the importance and influence of this branch of organ-building, from the following observations in reference to the speech of an organ pipe.

388. The wind on entering a pipe is blown through the wind-way in a thin sheet against the upper-lip; the mouth or intermediate space being covered by this stream of air. This "sheet of wind," as it is called, is exposed externally to the outward air, while on the inside it is defended from it by the back and sides of the pipe. The wind that comes out at the mouth of the pipe passes violently upwards against and above the leaf; causing an inward draught underneath, towards and indeed through the mouth. The former fact may be ascertained by blowing *smoke* into a pipe and watching its progress; the latter, by holding a lighted candle just below or in a line with the mouth of a pipe while speaking, when the flame will be drawn towards or even through the mouth. The inward-bearing draught outside the mouth being stronger than the quiescent air within, the sheet of wind gives way for an instant, and the draught bears into the pipe, but is immediately overcome by

the sheet of wind, which in its turn prevails until the draught overcomes it again. Hence the periodical concussions of the sheet of wind against the upper lip of the pipe.

389. This alternate crossing of streams will, under ordinary circumstances, of course take place with greater or less rapidity, according to the dimensions of the mouth, and the strength of the wind exciting the column of air within the body of the pipe; and the elastic motion of the lower end of the column of air in the region of the mouth—by compression and expansion—assists in the alternate restitution of the sheet of wind and the inward-bearing draught by turns. The pitch of the sound of a Flue Pipe therefore is regulated as much by the number of pulsations which take place at the *mouth* of the pipe in a second of time, as by the number of vibrations that occur in the *body* of the pipe in the same time, with the latter of which the former doubtless correspond. This hypothesis is borne out by the fact, that if a pipe be shortened, as in transposing a GG metal Open Diapason into a CC, it does not then require *less* wind, but *more;* the additional quantity no doubt being required to *accelerate* the vibrations at the mouth, so that they may be in proportion to the quicker vibrations of the shortened column of air inside the body of the pipe.

390. It has already been explained, that some proportion is preserved between the dimensions of the mouth and the *diameter* of the pipe; but the *length* of the vibrating column of air may be *somewhat* increased or decreased without much affecting the speech, as may be ascertained by temporarily covering one or more of the lower holes in the back of a front pipe which has openings in it. If, however, the length of a pipe be very great in proportion to its diameter and the dimensions of its mouth, the pulses at the mouth will not be *slow* enough to correspond with the waves of the lengthened column of air; and the pipe will then either not speak at all, or it will break into some higher sound. This circumstance accounts for Dulciana pipes, the smallest in scale of any open pipes in an organ, and with even narrower mouths in proportion, having so decided a tendency to "speak their octaves" when in the slightest degree out of order. For some stops, it is required that the pipes *shall* speak their octave and *not* give their unison sound, as in the German "Flauto Traverso"; in which case, the voicer regulates the dimensions and proportions of the mouth accordingly. At the same time, a pipe in which the proper proportions are preserved in regard to length, diameter, and mouth, will break off into a higher sound, if it has more than a certain amount of wind, or a stronger wind; as in the "Flute Harmonique" of the French and English organ-builders.

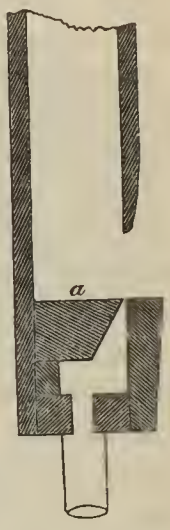
391. In cutting the wind-way, if the opening be made too deep, the "sheet of wind" will be too thick, and the inward-bearing draught will be unable to break through; in which case, the pipe will not speak with the proper strength, but will simply produce a humming or whizzing sound. Or if the mouth of a pipe be "cut up too high," the sheet of wind will not entirely cover the space forming the mouth; in organ-builders' phraseology, "the wind will not reach;" and the speech of the pipe will be dull and unsteady.

392. In *wood* pipes of the four-sided shape, the width of mouth of course corresponds with the inside measure of the same side of the pipe in which it is cut. Its height is commonly one fourth of its width, or a little more; but, inasmuch as wood pipes are, as already explained, sometimes made narrow and deep, the mouth being on the narrow side, while at others the mouth is placed on the wide side, it is

evident that its measure in the direction just mentioned must be subject to much greater variation than in metal pipes.

393. In some German *wood* pipes, the blocks and other parts connected with the speech of the pipes are made on a plan so different from any of the English methods already noticed, and yet produce so firm and full a tone, even when the scale is small, that a few particulars concerning them are here introduced. Instead of the block being formed with its face at a right-angle to the top, it is bevelled back and downwards, as shown at *a*, in *fig.* 94. The cap is made straight and smooth inside, instead of being hollowed as in *figs.* 90, 92, and 93; and in lieu of the wind-way being made by filing a portion from off the *cap*, it is formed by filing from off the *block;* and the upper-edge of the cap is set on a *level* with the top of the block, instead of *a little below it.*

94



394. A glance at the accompanying diagram (*fig.* 94) will be sufficient to show that in a pipe thus formed the wind must gradually undergo increased compression as it ascends through the wedge-shaped hollow between the block and cap, and that it must in consequence be thrown with much greater force against the lip; a stronger and clearer tone being thus secured. The mouth is cut up much higher than ordinary, it frequently being equivalent to three-fourths of its width, and sometimes even more; and the lip is left thick, that the wind may take good hold. There are no nicks either in the block or the cap; the latter of which is made about half as thick again at the mouth end as at the foot end, to prevent the inward-bearing draught being too strong, and thus, in a neater manner, serve the purpose of a *beard.* The hole in the pipe-foot is made very large, and is perfectly round; there is no *plugging*, and the speech is plumper than when the wind is carried through four three-quarter apertures, as in most plugged pipes. The lower end of the foot is leathered, so as to prevent an escape of wind between it and the upper-board.

395. The modern German *metal* pipes are made and voiced more nearly as in England, except that in some cases the *bevel* on the language is made *more acute* than in English pipes. *Fig.* 95 shows the English language and bevel in profile; *fig.* 96 exhibits the German in a similar manner. The acute bevel has the effect of throwing the wind more *into the pipe*, which permits the mouth to be cut up higher; the tone produced being remarkably full and bright. The inside of the pipes is coated with a *red lac*, which is doubtless intended as an imitation of the peculiar dark varnish which time places on the surface of old pipes; and which, by closing the pores in the metal and rendering the inner surface perfectly smooth, has something to do with the mellowing of the tone.

95

96

396. The *mechanical* part of voicing, so far as the *eye* can detect, consists, in the instance of a metal pipe, chiefly in cutting with great nicety a series of notches or *nicks* in the front part of the language. The "nicking" is made on the lower edge of the bevelled surface of the language, and the notches run parallel to

each other, and sometimes, though not always, at an angle to the axis of the pipe. There are different methods of voicing, which produce different results. A pipe that is not voiced at all, will frequently not sound at all, or will give a wrong note, or will not speak with adequate strength.

397. Large pipes, and sometimes comparatively small ones, will however occasionally present exceptions to the rule, if the mouth and parts adjacent are proportioned with mathematical accuracy. The front pipes of the organ at St. Giles's in the Fields, made by Harris, have no nicking, neither have several of the metal and wood Stopped Diapasons in the Temple organ. Pipes that have but few nicks will frequently produce a round sonorous tone, as is evidenced in many of Smith's Open Diapasons; while others, that are much and regularly nicked, will produce a softer and very musical tone, as in Green's Diapasons.

398. The voicing of a wood flue pipe consists of several small parallel lines, filed on the front or face of the upper part of the block. These little cuts do not run quite at right angles to the upper lip, neither are they made of the same width right down; but they are deepest and widest at the mouth, and gradually decrease as they recede from it, until at last they are lost in the plain surface of the block. In voicing the pipe, which of course is done before the cap is put on, the upper edge of the block is slightly pared away opposite the under-lip, so as to direct the wind against the upper-lip. If the angle be pared off too much or too little, the pipe will be slow to speak, or will speak ill, or perhaps not at all. Or if the sheet of wind be suffered to strike against the upper-lip with rather too much force, the tone produced will be imperfect, and perhaps accompanied with a chirping at the commencement of the pipe's speaking.

The influence of the material, form, and scale on the tone of a pipe.

399. Besides the many modifications or *characters* of tone (so to speak) which are produced by the particular method of voicing adopted, the tone of a pipe is influenced by many other circumstances.

400. And First, of the *material*. Supposing all other circumstances to be the same, it may be said, in regard to metal flue pipes, that the thicker and more elastic the body of the pipe is, the more decided, clear, and distinct will be the sound. According to some of the first German works on the subject, the tone of a pipe is improved by the material being well hammered before being worked up.

401. In regard to wood pipes, the same phenomenon may be observed as to the influence of the material on the tone; a pipe made of some hard wood, as oak, giving the clearest and strongest tone, while one of the softer kind produces the most mellow tone. When the old builders used a soft wood, they sometimes cut the planks the *cross-way* of the grain, probably from the circumstance of the wood of the bellies of Violins being cut in that manner. The deal pipes in the Finedon organ, Northamptonshire, built by the younger Smith, are formed out of boards cut in the direction just mentioned. If a comparison be drawn between the quality and strength of the tone of metal and wood pipes generally, a long open metal pipe will be found to give the clearest and most sonorous sound, and an open wood one a thick and heavy sound. This is, of course, supposing their measurement and all other circumstances to be about the same.

402. Then of the *form*. Pipes having the open cylindrical outline, when made to the full proportionate diameter, give the strongest, clearest, and fullest tone of any metal flue pipes. Those of the conical shape produce a rather more subdued sound than the cylindrical; accompanied either by a tender, reedy, or a *crying* character of tone, according to the extent of their conicality and the manner in which they are voiced. Pipes of the covered species emit the weakest sound; the chimney or the perforation, as the case may be, giving rather more freedom to the character of the tone.

403. By an alteration of *scale*, that is to say, an increase or decrease of diameter, while the same length is preserved, a further modification in the strength and character of the tone is produced.

404. The width or narrowness of a pipe alters the strength of the sound produced, and to such an extent, that an open cylindrical pipe (already described as giving the more powerful sound) may, by the reduction of its scale, be made to sound as lightly as a covered one, as will be perceived on comparing the strength of the tone of a Dulciana pipe with that of a Stopped Diapason pipe. Moreover, by enlarging the scale sufficiently, a pipe of soft wood—Christiana deal, for instance—may be made to produce a stronger and heavier sound than a pipe of hard wood, as oak.

Influence of the strength and quantity of the wind on the character and strength of the tone.

405. In addition to the influence which the material, form, and scale of a pipe exercise on the tone produced, the strength of the wind by which it is made to speak, or the quantity allowed to enter the pipe, or both, effect a further alteration in the strength of the sound. A stronger and a greater "flush of wind," within certain bounds, causes a pipe to give a fuller and brighter tone. If the jet of wind, however, be too great or too strong, the pipe will "overblow," and give the octave of its true sound. A strong wind causes the sound produced to be also rather higher in pitch, as well as stronger and brighter. An illustration of the influence of a *lessened* strength of the wind on the quality, power, and pitch of the sound of a pipe, occurs when the wind is being "let out." The sound then gradually becomes duller, weaker, and *lower*, until it altogether ceases; or it will *rise* in pitch, and speak louder and clearer again, as more wind is supplied just before the sound dies away.

406. Experiments have proved that reed-stops acquire a considerable accession of power and splendour by being placed upon a heavier wind than the flue stops. The first organ in England that had a reed stop voiced to a heavy pressure of wind, is that in the Town Hall, at Birmingham; into which instrument the stop alluded to, called the "*Tuba Mirabilis*," was introduced in the year 1840.

407. In France, the influence of different strengths of wind has been turned to still greater account by the ingenious artists, Messrs. Cavaillé Coll, organ-builders to the late French government, in the fine instruments built by them for the Abbey Church of St. Denis, near Paris, and the Church of the Madeline in Paris. In these admirable organs, they have not only placed the reed stops on a heavier wind than the flue, but have increased the weight in the treble by an inch. This latter application was suggested by the fact of performers on wind instruments, in order to render the acute tones of equal strength with the grave, exercising a greater effort

of the muscles of the lungs, when sounding high notes than when producing low ones. By supplying the pipes of the upper keys with a stronger wind, the weakness at times observable in the treble of organs is entirely rectified.

408. The same intelligent builders have further succeeded in making reed and flue stops produce an harmonic instead of a ground tone, and hence called "Trompet Harmonique," and "Flute Harmonique." See Foreign Specifications, Nos. 12 and 13. The pipes are made of double or even four-fold length, and, by a strong and copious wind, made to "overblow," and so sound the octave or the super-octave.

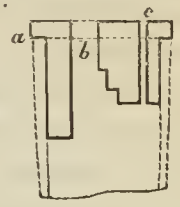
409. In the magnificent new organ lately erected in London, by Mr. Hill, in the Panopticon, the builder has incorporated not only the several modern continental improvements above referred to, but also some new mechanical inventions of his own. The organ in the Glasgow Town Hall has also the great reeds and two harmonic flutes on a heavy wind, and the treble of the organ on a stronger wind than the bass.

Formation of a reed-pipe.

410. A reed-pipe of an organ is formed of a *mouthpiece*, composed of a *block*, *reed*, *tongue*, and wooden *wedge*, with a *tuning-wire* and *boot*; and a *tube* or *body*.

411. *The block* of a reed-pipe (*fig.* 97) is, in modern specimens, usually a circular and rather solid mass of metal, cast in a mould; though in old reed-pipes the blocks are frequently of box-wood, turned in a lathe. From the block, the reed and tongue hang suspended *below*, and the tube rises *above*. Through the block, two round holes (*b c*) are left in the casting; the largest of which (*b*) forms the passage-way for the wind from the reed into the tube; and the smallest, which occurs a little in advance of the first, admits a wire that is required for regulating the precise length of the vibrating portion of the tongue, presently to be noticed. The upper part (*a*) of the block is made rather wider than the lower, forming a rim that rests on the upper edge of the boot.

97



412. *The reed* is a small cylindrical tube of brass (*fig.* 98), slightly conical in shape, being usually widest at the lower end, and having the lower end closed by a piece of brass, which slants a little upwards and backwards. In the front of the reed, an opening is left (*d*), running lengthways, presenting an appearance as though a portion of the reed had been cut away, at which the wind enters. The upper end of the reed is fitted tightly into the larger hole in the block already mentioned, with the opening towards the smallest hole.

98 99

413. *The tongue* (*fig.* 99) lies immediately over the opening just noticed in the reed, covering also the edges which border it. It consists usually of a thin, tough, and elastic plate or spring of brass, and is fixed in its position by the upper end being passed a little way up into the block, and then a small wooden wedge being driven into the part of the circular hole in the block that was left vacant on the flattened side of the reed. The lower end of the tongue, therefore, is left entirely free, and is slightly curved.

414. *The tuning-wire* (*fig.* 100) is a moveable piece of bent steel-wire, that passes through the small hole in the block, in front of the reed and tongue. The lower part of it is bent up, as shown at (*f*) in the accompanying illustration, so as to press against and across the tongue. So much of the tongue as may be *above* the point where the tuning-wire crosses it, is pressed firmly against the reed and prevented vibrating: the wind, therefore, only agitates that part that is *below* the wire. As, however, the wire is moveable, the vibrating portion of the tongue can be lengthened or shortened at pleasure; and the upper end of the tuning-wire is hooked, so that the tuning-knife may move it upwards or downwards the better.

415. *The boot* of a reed-pipe is the short upright and strong tube of metal into which the greater portion of the block sinks (see *fig.* 79, page 81, and *fig.* 97, page 93). It therefore has to support the weight of the entire pipe; in addition to which, it receives the wind, through a hole in the lower end, from one of the borings in the upper-board, over which it rests and indeed sinks into a short distance, and directs it up to the reed.

416. *The tube* of a reed-pipe, as already explained, presents the outline of a cylinder, an inverted cone, an inverted cone with a bell, or an inverted pyramid (see *figs.* 74, 75, 79, 81, and 85; pages 80, 91, and 92), according to circumstances; and rises from the surface of the block, to which it is soldered, in the instance of small metal pipes. In larger pipes this is not so, but a short tube called a socket is introduced, which receives the narrow end or "neck" of the longer tube, and sustains it firmly and steadily. Sockets are of course necessary for reed-pipes of all sizes that have *wooden* tubes, as illustrated in *fig.* 85, page 82; and the lower end of each tube has then to be rounded off to make it correspond in form with the circular shape of the socket that is to receive it.

417. It might prove interesting to the reader now to refer to the various kinds of reed pipes represented on pages 65, 66, 70, 72, and 76; and trace out for himself their several peculiarities and points of difference, as well as their separate parts, so far as they are in sight.

The formation of the tubes.

418. Metal tubes, like the bodies of flue pipes of the same material, are formed of sheets of metal, cut to such a shape as will, when rolled and soldered up, give to the tube the required form and proportion. The bell, if the addition of one be required, is of course applied afterwards. That part of the metal plate which is to form the neck of the tube is left much thicker than the other end, in order that it shall neither sink nor snap off under the pressure of the upper and broader part. Wooden tubes are formed of four boards each, comparatively wide at the upper end and narrow at the lower, glued and nailed together.

The different kinds of mouth-pieces or reeds. The open, closed, and free-reeds.

419. The opening, already noticed as occurring in the front of the reed, either extends all the way up, as shown in *fig.* 98, or only partially so, and gradually contracting to a point. The former is called the "open reed," and is the same in kind that

has been in use for centuries: the latter is termed the "closed reed," and is of modern invention.

420. *The open reed* admits by far the greater quantity of wind into a pipe, the influence of which increased volume excites the tongue to vibrate against the reed with more force, and so to produce a stronger and clearer tone. Hence it is generally considered to be the description of reed the best adapted for all powerful and prompt-speaking reed-pipes. It requires a rather longer tube than the closed reed.

421. *The closed reed* allows only of a lessened draught through it, and is on this account considered by some organ-builders to be well adapted for reed-pipes, the tone of which is required to be of a quieter character; though it is not indispensable to employ them to obtain a subdued tone, inasmuch as some organ-builders eschew the use of closed-reeds altogether. Moreover they present a much larger surface between the reed and tongue, whereon dirt may lodge.

422. *The free reed.* A third kind of reed is used on the continent, called the free-reed. In this variety the size of the tongue and the opening in the reed are so adjusted in regard to each other, that the former almost exactly fits the latter: the tongue, therefore, instead of striking on the edges of the reed, is impelled into the opening by the wind; when, from its own elasticity, it resumes its former position; and the sound is produced by its rapid vibratory motion to and fro through the air. The tone of a *free* reed is not usually so strong as that of a *striking* reed, but it is particularly smooth and free from rattling. Some fine 16 and 32 feet Posauns have been made in Germany of free reeds.

The influence of the tube, its shape, scale, and material, on the strength and character of the tone of a reed-pipe.

423. It will be remembered to have been stated (*ante*, p. 83, sec. 355) that a reed-pipe does not depend upon its tube for the gravity or acuteness of the sound produced, but chiefly on the dimensions and other circumstances connected with its tongue. The tube, however, makes a considerable difference in the *strength* and *character* of the tone. Were it otherwise, there would exist no sufficient reason for its introduction. The dimensions of the tube are so adjusted to the size of the tongue, that the vibrations of the column of air contained in the former shall correspond with the vibrations of the latter. Where this accordance does not exist, the sound produced is inferior in quality. It is not absolutely necessary that the tongue and the column of air in the tube should be in unison, to produce a musical sound; but the tone of small scale reeds is always more pleasing, and that of larger reeds more full and rich, when the unison is perfect. Short-bodied pipes of the cylindrical shape give a comparatively light sound; as may be ascertained by trying any Clarionet or English Vox Humana Stop. Pipes with tubes of the inverted conical form give a more sonorous tone than the last-mentioned—the strength and character of the sound being governed to some extent by the scale and length of the tube. When it is of narrow measure, the tone is rather thin and somewhat nasal, as in most Bassoon stops. When the pipe is similarly shaped, but with a bell added, the tone becomes somewhat clearer, more wailing and attenuated, as in a Hautboy stop. The weight and power of the sound increases with the further increase in the scale; the Trumpet being louder and more smart than the Bassoon; and the Posaun more ponderous than the Trumpet.

The influence of the reed and tongue on the tone of the pipe.

424. The strength of tone, again, depends much on the shape of the opening in the reed; whether the tongue be made of common brass, or a composition containing a larger proportion of copper; the thickness of the tongue; its curvature; and the smoothness and flatness of the edges of the aperture against which the tongue vibrates. Reed-stops of delicate intonation, as the Hautboy, Clarionet, and Bassoon, have long, narrow, and thin tongues; others of strong and full tone, as the Trumpet, Horn, and Posaun, have shorter, broader, and thicker tongues. Many of the old Trumpet stops have reeds that are either larger or broader than those now used, and shorter tubes; which accounts for their tone being thin, and devoid of the power and impressiveness which characterise all good stops of the kind.

How a sound is produced from a reed-pipe.

425. When the tongue of a reed-pipe is in a state of rest, it is curved, leaving the opening in the reed free to the admission of air. The peculiar *tone* of a reed-pipe is, in the instance of a *striking* reed, produced by the tongue beating against the reed, and rebounding again by the force of its own elasticity. The tongue is excited by a current of air being thrown on to it from below; which, as it rushes through the opening in the reed, draws or sucks the tongue with it towards the reed, against the edges of which it strikes, and then returns.

426. In a *free* reed, the sound is produced by the motion of the tongue to and fro; and, as that motion is never checked or interrupted by the tongue striking, the tone is as smooth and continuous as that of a flue-pipe.

How the pitch of the sound of an organ-pipe is determined.

427. The *pitch* of the sound produced by a reed pipe is determined by the number of beats or vibrations made by the tongue in a second of time; and the reeds are accordingly made small or large, depending on the acuteness or gravity of the sound each is required to emit. The higher the pitch of the sound, the smaller must be the reed, and the quicker the vibrations of its tongue; the deeper it is, the larger must be its reed, and the slower the beats of its tongue upon the reed, and perhaps even audible. In a flue-pipe the pitch is governed by the length of the body of the pipe, or, more strictly speaking, by the length of the column of air within that body; which follows the simple geometrical law, that by doubling the length, it sounds an octave lower; and by halving the length, it sounds an octave higher.

428. The following table exhibits at one view the number of vibrations which take place in a flue-pipe, and the number of blows made by a striking reed in a second of time, in producing the several C sounds used for organ-stop measurement; while, to the right, the shortened length of the pipe is given.

Name of C.		Vibrations in flue-pipe.		Blows of tongue in reed-pipe.		Length of open flue-pipe.
C C C C	—	32	—	16	—	32 feet.
C C C	—	64	—	32	—	16 ,,
C C	—	128	—	64	—	8 ,,
Tenor c	—	256	—	128	—	4 ,,
Middle c^1	—	512	—	256	—	2 ,,
Treble c^2	—	1024	—	512	—	1 ,,

429. It is necessary to mention that the above table of vibrations refers to *single* and not to *complete* or *double* ones. As the latter are used by some writers on harmonics, the difference might create confusion, if not explained. The tongue of a reed-pipe strikes when vibrating *towards* the reed, but of course *not* when vibrating *from* it; hence the beats made by the tongue in a reed-pipe only amount to *half* the number of vibrations taking place in a flue-pipe in the same time, as shown in the above table, which accounts for those beats often being discernable to the ear in the speech of even 16-feet reed-stops. When, therefore, the rustling of the tongue of large reed-pipes cannot otherwise be silenced, the front of the reed is lined with a thin coat of leather—simply the dressed part, the *fleshy* part being cut or scraped away—so as to form a soft surface for the tongue to strike against.

430. The wind having passed through the mouth-piece of a reed-pipe, the *size* of which has defined the *pitch* of the sound, it passes into the tube; the shape, material, or scale, or all combined, imparting to such sound the *character* and *strength* required.

CHAPTER XIX.

THE STANDARD LENGTH OF ORGAN-PIPES.

431. ORGAN-pipes, and particularly those of the flue species, are made to a great variety of sizes. The greatest standard length of a speaking-pipe is 32 feet; the shortest, $\frac{3}{4}$ of an inch. The foot is not of course taken into calculation, as that is nothing more than a supporter and wind-channel to the pipe. The sound of the two pipes of the extreme measurement just mentioned would be 9 octaves apart; consequently, a complete range of organ-pipes, including all the semitones, would present a series of 109 different sizes.

432. Organ-pipes do not always measure the *exact* length quoted; but they will fall a little short of, or, in some cases, rather exceed, that measurement, as the case may be. Hence a distinction is drawn between the *literal* length, and the *standard* or *quoted* length of a pipe; the latter generally presenting an *approximation* only to the former. Many circumstances tend to render an adherence to the literal length almost impossible; as, for instance, a stronger or lighter wind, which would demand a longer or shorter pipe to produce a sound of the same pitch; the more copious winding of a pipe, which would cause it to "blow sharp," and would therefore require a longer body to produce a sound of the original pitch; the difference in the foot measurement in various countries; the variation of pitch; or an alteration in the scale, or in the outline of the pipe.

The names of the sounds produced from organ-pipes.

433. From the circumstance of every septave of pipes and sounds included in the extensive range just mentioned being called by *the same* seven letters, it becomes a matter of necessity that, in order to obtain a clear view of the whole, some means should be adopted for distinguishing each septave from the others. This advantageous classification is established either by the aid and use of some special kind of letter—capital or small; by some particular kind of letter, with a sign added thereto; or by two, three, or four capital letters grouped closely together. In some few cases, a particular *name* is also given to a particular pipe or sound; though it considerably simplifies the nomenclature by confining the application of such names solely to the *keys*.

434. For most musical purposes, the *notation* indicates with sufficient precision the gravity or acuteness of the sound that may be expected to be heard; because many instruments, and all voices, produce but a sound of one unvarying pitch for each note, and that one agreeing with the music written. With the organ, however, the case is different; for, in some instances, eight or ten different sounds are concentrated on one key; which are produced from as many separate pipes, of nearly as

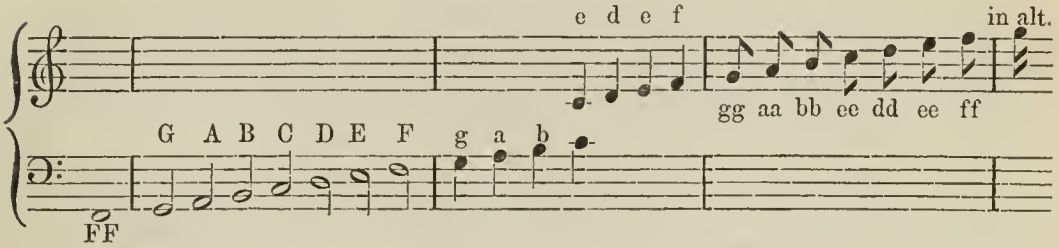
many varying lengths; therefore, a definite *pitch* cannot invariably be associated with the *note* written, nor with the *key* struck, in the case of an organ, or of organ-music; since the sound produced may be in accordance therewith, or it may be one or two octaves lower, or one or two octaves higher, or a combination of all, according to the nature of the Stop or Stops drawn.

435. Nevertheless, the several octaves and keys on a manual, and also some of the intermediate keys in those octaves, have distinctive names, by which they are conveniently referred to in the course of writing, or in conversation. These names have originated from various sources.

The classification of those sounds into octaves; and the different methods by which the several octaves are distinguished from one another.

436. In olden times, the 21 degrees, commencing on the first line in the bass, and ascending to and ending on the fifth line in the treble, were termed the *gamut*, or musical scale; which gamut comprised a range of two octaves and a minor seventh. The several sounds therein contained were represented by letters, which at the same time corresponded with the name of those sounds; but to distinguish such sounds as were represented by the same *letter*, but which differed in *pitch*, a different *kind* of letter was used, sometimes accompanied by another attendant characteristic. Thus, the first septave was represented by *capital* letters; the second, or that next above, by *small* letters; and the third and upper one by *two small* letters; thus—

EXAMPLE.



437. On this gamut* being in the course of time extended, the next seven keys and diatonic sounds represented by notes immediately *below* the bass stave were termed *double*, and were marked with *two* capital letters, as C C, D D, &c.; while those forming the first septave *above* the treble stave were said to be *in alt.* The *second* series of seven diatonic sounds below the original "gamut," commencing with F, the fourth line below the bass stave, were distinguished by *three* capital letters, as C C C, D D D, and so on; and the remaining four diatonic sounds from G G G to the C below were marked with *four* capital letters, as C C C C, D D D D. Then *upwards*, the sounds in and higher than the second octave above the treble stave, i. e. from *g*, the fourth line above the treble stave, were said to be *in altissimo.* This completed the English tablature.

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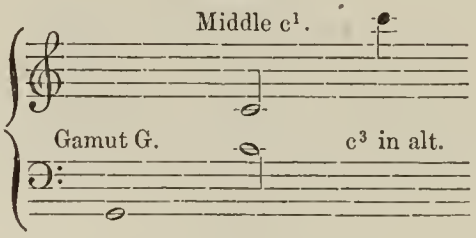
* Guido Aretinus, a Benedictine monk of Arezzo, in Tuscany, in the tenth century, was the inventor of the gamut above referred to; though it is not perhaps so strictly an invention as an improvement on the *diagramma*, or scale of the Greeians. Previous to the time of Guido, the septaves were reckoned from A; but that ancient theorist added the G below, and denoted it by the Greek *gamma*, Γ. Hence arises the word gamut, or gamma ut, it being the ut or first sound of the G hexachord.

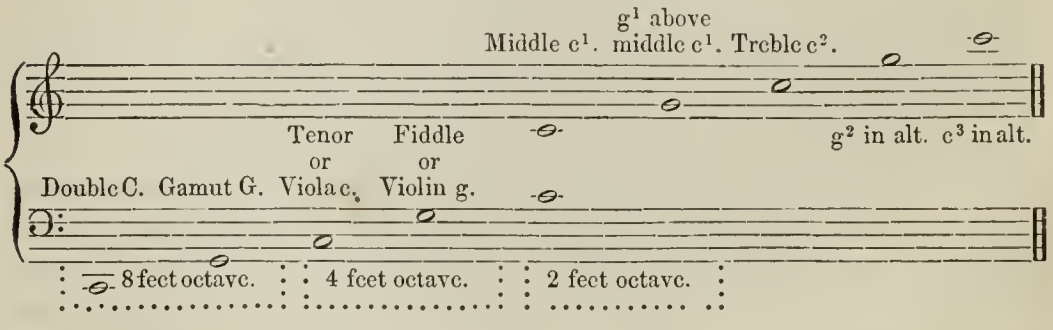
438. But it will be perceived that it presents neither the names nor signs by which the highest two and a half octaves of pipes and sounds can be distinguished from each other; and is therefore so far defective. Moreover, the terms "in alt" and "in altissimo" are inconveniently long for the practical purpose for which the distinguishing terms are so useful in organ-building, namely, for marking the composition of the Mixture Stops in various parts of the scale.

439. From the above nomenclature, however, two of the most useful *names*, as well as one of the *terms* used at the present day by organ-builders, as part of the tablature applied to the *keys* of the manual, have been borrowed; while as many of the remaining terms are preserved to distinguish the deeper sounds that are below the unison range of the modern manual. The former are (1) gamut G, or the lowest G of Guido's gamut; (2) middle c^1—the "mean" or middle cleff c^1 of the same gamut, represented by the note on the ledger line between the bass and treble staves; and (3) the term "in alt" for the keys above the treble stave.

EXAMPLE.



440. Some of the other keys are named after certain string instruments, from the circumstance of their unison sound corresponding with the lowest sound produceable on such instruments; as Tenor (or viola) c, and Fiddle (or violin) g. These several names and terms, with the additional three, viz. "double C," "g^1 above middle c^1," and "treble c^2"—the latter applied to the c represented by the note of that name in the treble stave—form a complete tablature for the several C and G keys of the organ manual, as shown in the following table.

EXAMPLE.

441. The several septaves—or octaves, as they are more frequently, though less strictly, called—which occur on a manual comprising the above gamut, are sometimes distinguished by the name given to the C with which each commences; as, the Bass octave; Tenor octave; Middle octave; Treble octave; and Top octave, or half octave, as the case may be. In addition to this, they are sometimes referred to by the standard length of the C that commences each octave; as the 8-feet octave, the 4-feet octave, &c.

442. But, as before observed, the number of different *sounds* in an organ far exceeds that of the *keys* on the clavier; hence arises the necessity for some method of grouping the *additional* sounds, and indeed all sounds, into octaves, and of calculating and measuring them. And first, of the classification of the sounds *within* the usual manual compass. According to the old English system, G was made the starting sound for this purpose, as shown in the first "gamut;" while, in Germany, C has for a long period been recognised as the standard sound. In the latter country, the lowest octave on the manual, corresponding with the "Bass octave" of the table above given, is called the "great octave," and is represented by single capital letters, as C, D, E, &c. The next octave, identical with the English "Tenor octave," is termed the "small octave," and is distinguished by small letters, as c, d, e. The third octave, or "Middle octave" of the English, is called the "once-marked octave," represented by small letters with a small figure 1 to the right and a little above the letter, thus—c^1, d^1, e^1; while the "Treble octave" is called the "twice-marked octave," c^2, d^2, e^2; the remaining half octave, from "c^3 in alt to f^3 in alt," forming a portion of the "thrice-marked octave," c^3, d^3, e^3. Sometimes so many little horizontal lines are used instead of figures, thus—$\overline{\overline{c}}$; which system, however, has an air of complication about it.

443. Then, of the sounds *above* the compass of the ordinary organ manual, the octave commencing with c in altissimo is termed the "four-times marked octave," as c^4, d^4, e^4; and the octave higher again, the "five-times marked octave," as c^5, d^5, e^5. Of the sounds *below*, the 16-feet octave is called the "first sub-octave," distinguished by capital letters with a line underneath, $\underline{C}$, $\underline{D}$, $\underline{E}$, and the 32-feet octave, counting downwards from the "contra C," as the Germans call the 16-feet C, is termed the "second sub-octave," distinguished by capital letters twice underlined, thus—$\underline{\underline{C}}$, $\underline{\underline{D}}$, $\underline{\underline{E}}$.

444. The English tablature for distinguishing the several octaves of manual keys, including some of the intermediate keys, is so complete, distinct, and satisfactory, that nothing advantageous would be gained by relinquishing it in favour of the German; but as the English tablature presents no means for classifying the higher sounds, the German nomenclature above given might, under such circumstances, be beneficially received. It will therefore be adopted in the chapter which treats of the composition of Mixtures; and, in order to give an easy clue thereto, the English names which refer to the several C and G sounds comprehended in the compass of the manual will also be introduced, that the *names* in the one case may explain the *tablature* in the other.

445. For the 16 and 32 feet octaves of pipes and sounds, we have in England a tablature of our own, and one that is so thoroughly understood and generally received that there exists no necessity for adopting any other.

The size of the pipes mostly used for stop-measurement.

446. Many of the pipes, especially those sounding C, E, or G, form the lowest of a series, or organ-stop, and therefore fix the standard length of that stop. It is necessary, therefore, to refer to these.

447. *The C of 32-feet length.* The sound of this pipe is below that of any other musical instrument. It is called either the "32-feet C pipe," from its standard

length; the "4 C pipe," from its English designation; or the "twice under-marked C," according to the German tablature. Its sound is an octave below the lowest C of the grand Pianoforte.

448. *The C of* 16*-feet length.* The sound of this C is in unison with the lowest C of the grand Pianoforte; and is represented by a note in the sixth space below the bass staff. It is the "CCC" (pronounced 3 C) of the English tablature; the "Contra C," or "once under-marked C," of the German, and the "16-feet C" pipe.

449. *The C of* 8*-feet length.* The pitch of this pipe is in unison with the lowest sound (produced from the open fourth string) of the Violoncello; and is represented by a note on the second ledger line below the bass staff. It is the English "C C" (double C); the German "great C;" or the "8-feet C pipe."

450. *The C of* 4*-feet length.* The sound of this pipe is in unison with the lowest note of the Tenor Violin or Viola, and also of the old Tenor Hautboy, or Tenoroon*; on which accounts it is frequently called "Tenor C." It is represented in the English tablature by a capital C; but in the German by a small c. Its sound is indicated by a note in the second space of the bass staff.

451. *The C of* 2 *feet.* This pipe sounds in unison with the lowest C of the Hautboy. Its pitch is represented by a note placed on the ledger line between the two staffs. According to the English tablature, this sound would be denoted by a small c; according to the German, by the once-marked c^1. This is called most frequently "middle c," from its being the middle one of the three cs included within the ancient gamut; but more particularly from the note that represents it being placed on the same line as the cleff of the middle, mean, or intermediate parts—the counter tenor and tenor—in vocal compositions.

452. *The C of* 1 *foot.* The sound of this pipe (in unison with the lowest note of the Flauto Piccolo) is represented by a note placed in the third space in the treble staff. It is distinguished in the English tablature by two small letters, c c; and in the German by the twice marked c^2. It is also known as treble c^2.

453. *The C of* 6 *inches.* This is the English "c in alt," and the German "thrice-marked c," c^3. Its sound is represented by a note on the second line above the treble staff.

454. *The C of* 3 *inches.* The English "c in altissimo," and the German "four-times marked c," c^4. A note in the sixth space above the treble staff denotes its sound.

455. *The C of* $1\frac{1}{2}$ *inch.* The five-times marked c of the German tablature, c^5. The 7-octave grand Pianofortes are sometimes made up to this note.

456. *The C of* $\frac{3}{4}$ *inch.* The six-times marked c, c^6. This is the smallest pipe made. Its sound is 2 octaves above c in "altissimo."

457. The Cs are the most important class of organ-pipes, not only because they are the most convenient and proper ones that can be adopted as a foundation for the purpose of stop measurement, of which more in another chapter; but also because pipes of that sound commence and conclude the great series. The class next in im-

* The name Tenoroon has sometimes been given to an organ-stop, which, however, does not resemble the instrument named in the text, either in regard to pitch or quality.

portance are the G pipes, which denote the foundation measurement of G G organ-stops, and also the size of the fifth-sounding stops of C organs.

458. The following are the lengths of the chief G pipes.

459. *The G of* $21\frac{1}{3}$ *feet* (24 feet) standard length. The sound of this pipe is a fifth above that of the 32-feet C. It is the "G G G" (three G) of the English tablature, and the "twice under-marked G" of the German.

460. Two different lengths are here given for the G pipes. The first is in every case the correct one, and therefore the best one to be written down or engraved; the other, in brackets, is necessarily made use of in conversation for convenience and for brevity sake. The latter is not so well adapted for the Stop-labelling, because it would lead to some confusion in regard to the lengths. For instance—the standard length of a Twelfth is one-third the length of the Diapason; therefore, if the former were to be marked 3 feet, the latter would appear to be wrong at 8 feet, and might be supposed to be a misprint of 9 feet, which would be a second error.

461. *The G of* $10\frac{2}{3}$ *feet* (12 feet). The sound of this open pipe is represented by a note placed in the fourth space below the bass staff. It is the "G G" (double G) of the English tablature, and the "once under-marked G" of the German.

462. *The G of* $5\frac{1}{3}$ *feet* (6 feet). The sound of this pipe is represented by a note placed on the first line of the bass staff. It is the "great octave G" of the Germans, and the English "gamut G."

463. *The G of* $2\frac{2}{3}$ *feet* (3 feet). The sound of a pipe of this length is represented by a note in the third space below the treble staff. In both the English and German tablature it is denoted by a small g. It is the English "Fiddle g."

464. *The G of* $1\frac{1}{3}$ *foot* ($1\frac{1}{2}$ foot). A note placed on the second line of the treble staff represents the sound of this pipe. It is marked in the English tablature by two gs, g g; and in the German by a g once-marked, g^1. It is called "g^1 above middle."

465. A third class of pipes may be noticed, as being used for the purpose of stop-measurement; viz. some of the E, or third-sounding pipes.

466. *The E of* $6\frac{2}{5}$ *feet.* The sound of this pipe is a major third above that of the C C or 8-feet pipe. The gravity of its sound is represented by a note on the first ledger line below the bass staff. It is the English E E (double E); the German "Great E."

467. *The E of* $3\frac{1}{5}$ *feet.* The sound of this pipe is a third above that of the tenor C, or the 4-feet pipe. Its sound is represented by a note in the third space of the bass staff; and is denoted by a small e in the German tablature, and by the term "Tenor e," mostly, in England.

468. *The E of* $1\frac{3}{5}$ *foot.* The sound of this pipe is a third above that of the middle c^1, or 2-feet pipe. A note placed on the first line of the treble staff represents its sound. It is the small e of the English tablature; the "once-marked e^1" of the German; and is the "middle e^1" of ordinary phraseology.

CHAPTER XX.

THE SIZE OF TONE OF ORGAN-PIPES.

469. BESIDES the description of pipe, i. e. the open, noticed in the preceding section—wherein the standard length of the body accords with the pitch of its sound—there are other kinds, the sound produced from which is much lower or "larger" than what the length of the body would indicate. The chief of these are the stopped pipes, which produce a sound as deep as that of an open pipe of twice the length, or nearly so, for the reason explained when speaking of the form of pipes.

470. As the *length* of such pipes would be no criterion of their sound, and yet it is most necessary to know what pipes of different conformation will speak *in unison* with each other, the *length* of the several kinds of *short-bodied* but *low-sounding* pipes is dispensed with, and in lieu of this they are measured according to the gravity of the sound they produce, or, in other words, according to their *size of tone*.

471. In speaking therefore of pipes, the bodies of which measure much less than the "standard length," they are said to give the 8, 16, or 32 feet *tone*, according to whether the sound they produce be in unison with an open pipe of 8, 16, or 32 feet measurement. To prevent, however, their being confounded with the open pipes of superior length, the word "tone," "sound," or "pitch," is added, which, of itself, implies that the bodies are not of that *standard* size.

472. The very important difference between "standard length" and "size of tone" may be familiarly illustrated in the following manner.

473. If an open pipe, say a Clarabella, be blown with the mouth, and the top be covered with the flat palm of the hand, its pitch will be lowered to the extent of a major seventh. And a similar lowering of the sound would take place in a larger pipe, say the 8-feet C. The latter would not, however, on that account be transformed from an 8 into a 16 feet *pipe;* its sound or "size of tone" only would be altered, its *length* would remain the same. A smaller pipe would simply be made to produce the sound of a larger.

474. The full range to which stopped pipes have been made is 7 octaves, namely, from the 32-feet C tone to c^4 in altissimo, or perhaps a note higher. Reed pipes have been made to the same range; downwards in numerous German, Belgian, and Dutch organs; upwards occasionally in some of Harris's organs, who, at times, carried his Clarions right through in octave reeds, as in the late parish church organ at Doncaster, the manuals of which were up to d^3 in alt.

The scale of organ-pipes; and the influence which an alteration in the proportion exercises on the length.

475. The question here presents itself why the pipe in the above experiment did not speak the *full* octave below, instead of a major seventh only, if the column of air travelled the double distance. It was because the *bulk* or scale of the body remained *of the same size*. A stopped pipe is required to be of a somewhat *larger* diameter than an open one of the same length to produce the true octave below,

as will be at once ascertained by comparing a middle $\underline{c^1}$ Clarabella with a tenor c Stopped Diapason pipe. A middle c^1 Clarabella will measure $2\frac{1}{16}$ inches in depth, by $1\frac{5}{8}$ inch in width; whereas the latter will be about $2\frac{7}{16}$ inches, by $1\frac{13}{16}$ inch in depth.

476. The width or narrowness of any pipe, in proportion to its length, is termed its "scale;" and a pipe is spoken of as being of a "large scale" or a "small scale," according to the ratio which its diameter bears to its length. A pipe in which this width is carried to the full legitimate extent, is said to be of "full scale;" and when the diameter is narrow as compared with the length, it is said to be of "small scale."

477. An alteration of scale causes a slight difference in the length of a pipe producing a given sound; the length being reduced by an increase in the scale, and *vice versâ*. Thus, a large scale Open Diapason pipe sounding, say, middle c^1, is rather shorter than the corresponding pipe of a similar stop of smaller scale; while that of a Dulciana producing the same sound will be longer than either, on account of its measure being narrower than either. These variations are, however, subject to modification, from the influences mentioned in sec. 432, p. 98.

478. If the three pipes of different scales were to be made to the same length, all their sounds would differ in pitch from each other.

479. The length of a pipe producing a given sound is also slightly affected by an alteration in the outline of its body. Thus, a conical pipe will be rather longer than a cylindrical pipe of full scale, and its length will increase with the extent of its conicality. The following short table will suffice to illustrate the above several particulars.

2-feet (middle c^1) Flue-pipes.

Name.	Circum. at mouth.	Circum. at top.	Length.
Open Diapason	$6\frac{7}{8}$ in.	$6\frac{7}{8}$ in.	1 ft. $10\frac{5}{4}$ in.
Dulciana	$4\frac{1}{8}$ in.	$4\frac{1}{8}$ in.	1 ft. $11\frac{5}{8}$ in.
Gamba	$4\frac{1}{2}$ in.	$4\frac{1}{2}$ in.	2 ft. $0\frac{3}{8}$ in.
Spitzflote	$6\frac{1}{4}$ in.	$4\frac{5}{8}$ in.	1 ft. 11 in.
Gemshorn	$6\frac{5}{8}$ in.	$2\frac{1}{8}$ in.	1 ft. $11\frac{1}{2}$ in.

480. The foregoing observations refer to Flue-pipes; but the length of Reed-pipes is also modified by the outline and scale of the tube; the length increasing as the scale is enlarged or made to deviate from the cylindrical outline. A cylindrical reed, or Clarinet pipe, is very short, being little more than half the speaking length; a Bassoon pipe, slightly outspreading, rather longer; a Hautboy pipe, with a wider bell, longer again; a Trumpet, longer still; and a Trombone, or Posaun pipe, the largest in scale of any, also the longest of any.

2-feet (middle c^1) Reed-pipes.

Name.	Circum. at top.	Length.
Clarionet	$3\frac{1}{8}$ in.	1 ft. $1\frac{1}{2}$ in.
Bassoon	$3\frac{3}{4}$ in.	1 ft. 8 in.
Hautboy	$6\frac{1}{2}$ in.	1 ft. $8\frac{1}{4}$ in.
Trumpet	$8\frac{1}{2}$ in.	1 ft. $8\frac{3}{4}$ in.
Horn	10 in.	1 ft. 9 in.

CHAPTER XXI.

ORGAN STOPS.

Definition of a stop; and an explanation of the various kinds.

481. THE gross number of pipes contained in an organ consists of so many distinct longitudinal series or sets; some of which are for the separate use of the manuals, and others for the pedal. A series of pipes, the range of which extends from the lowest to the highest key of a Clavier; gradually diminishing in length and size; having the same quality and strength of tone throughout; and the mechanism of which will allow of their being sounded independently of those of the other series, is called a Stop. Or, viewed in another way, a Stop may be described as consisting of a certain number of octaves of pipes, extracted from the greater series—such as that of 9 octaves mentioned in the preceding chapter—commencing with some pre-arranged pipe. Thus, four octaves and a half of pipes from the open series, commencing with 8-feet C, would form a Manual Open Diapason; two octaves and a half, beginning with gamut G, would form a pedal Twelfth; four octaves and a half, commencing with 2-feet c^1, would be a manual Fifteenth; four octaves and a half from the stopped series, commencing with the C C C pipe, 16-feet tone, would form a Manual Bordun; the same compass from the reed series, commencing with the 8-feet C pipe, would form a Manual Trumpet; or two octaves and a half, from C C C, 16-feet pipe, a Pedal Posaun. Allowing a little for variation of scale, this will convey a very good idea of what an organ stop is.

482. Organ stops may, in regard to their compass—the way in which they are made to "draw"—and other circumstances—be divided into five classes, namely:

Whole stops;
Half stops;
Incomplete stops;
Short stops; and
Repetition stops.

483. *Whole stops* are such as have their compass extending through the entire range of the manual or pedal. To this class rightly belong the Open and Stopped Diapasons; the Dulciana, Double Diapasons, Principal, Fifteenth, Mixture, Trumpet, &c.

484. *Half stops* are those which are complete so far that they comprise an unbroken series of pipes inside the organ, throughout the Manual range—like the whole stops—but with this difference, that the draw-stop action and sliders are so contrived that the bass portion of such stops can be drawn independently of the treble, by

means af a second handle. Half stops occur the most frequently on those manuals which have some incomplete stops, and where the bass of one stop is therefore used as a substitute for the omitted part of other stops. The Stopped Diapason is very frequently "cut" for this purpose; the 8-feet octave being employed to complete the range of the Dulciana, when the latter stops at tenor c.

485. *Incomplete stops* are those which ought, from their nature, to extend through the entire compass of the manual, which should, in fact, be whole stops; but which, for some reason, are made in an incomplete form. A Dulciana without pipes to the bass, or 8-feet octave of the Manual, or a Bordun (Double Stopped Diapason), not having its full complement of pipes upwards, are incomplete stops. The difference between an incomplete and a half stop is, that the former is altogether *without* pipes in some portion of its compass, either in the treble or in the bass, as the case may be; whereas a half stop has its remaining pipes really in the organ, commencing where the first half or portion of the stop leaves off, but which can only be drawn on by means of a *second* draw stop.

486. *Short stops* are such as do not extend completely through the compass of the manual, and are not therefore whole stops; and which yet cannot strictly be classed either as half or as incomplete stops, since they are of limited range by nature. To this class belong many of the imitative stops. These, in many instances, take the extent of their compass from that of the instrument which they each individually represent, without reference to the compass of the manual on which they may happen to be placed. Thus, a Clarionet Stop that descends to tenor c sharp has the full range downwards of the instrument the name of which it bears, and therefore cannot fairly be ranked as an incomplete stop; neither can a Bassoon stop that ascends to b^1 flat above middle c^1 be correctly so classed, since it then has the full upward range of the ordinary orchestral Bassoon. When their compass is *less* than that just given, then they of course become incomplete stops.

487. Some imitative stops are classed as incomplete stops, even when their compass equals that of their prototypes, unless their range corresponds with that of the manual on which they are placed. This is the case with the Trumpet, Hautboy, Cornopean, and Flute, among others. The reason of this is, that such stops are used as frequently, if not more so, as combination stops than as solo, for the purposes of accompaniment; and are hence required to be of the same compass as the other stops of the organ employed for the same end.

488. *Repetition stops* are only met with in pedal organs, and only in such specimens of those as are of too short a range. A repetition stop is that whereof one octave of pipes is made to repeat on a second octave of pedals, or on a portion of them, when there is not quite a complete second octave of pedals for them to act upon. They are found most frequently in G G organs. They are incomplete stops with a return to hide the deficiency.

489. *Subsidiary stops.* Organ stops are further divided into sounding stops and subsidiary stops; the former being all such as produce tones like those already described, while under the latter head are classed the numerous devices, operated upon by handles, which aid in bringing the organ and its several resources more completely under control. The several manual and pedal couplers, therefore, are subsidiary stops; so also are the wind-trunk valves, or ventils, found more frequently

in Continental than in English organs. The distinction is a necessary one, for otherwise it would be possible in many organs to draw out 6 or 8 so-called "stops" without any sound whatever being producible from the instrument; whereas, by their being recognised as "subsidiary stops," no sound would be expected from them.

The size of the stops; how ascertained.

490. The numerous effects of which all well-planned organs are susceptible, result partly from the presence and use of stops of diverse form, nature, and character of tone; and partly from stops varying as well in pitch as in quality of tone, and other distinctive conditions. The most important and useful stops for the manuals are those of 8-feet, because they are in unison with the human voice, and are therefore particularly required for the accompaniment of singing. For the pedal, the 16-feet is the most useful (which, being twice the size of the most important manual stops, will of course sound an octave below them), as they form the true bass to the manual 8-feet stops. The size of a stop is ascertained and fixed by the length of the pipe that speaks on the lowest key of the clavier on which it appears. If it be a C C manual, and the 8-feet or C C pipe be placed on the lowest key, as in the Open Diapason, the series of pipes are said to form an "8-feet stop." If it be the tenor c or 4-feet pipe that is so placed, as in the Principal, the series of pipes compose a "4-feet stop." If it be a 16-feet pipe that is so situated, as in the Double Open Diapason, then the pipes are said to form a 16-feet stop, and so on. These quoted measurements refer more particularly to stops composed of open pipes, and the low C pipe of each of which is of the standard dimension given. Covered and other stops composed of short-bodied pipes are, as already explained, measured according to their "size of tone," irrespective of their length of pipe. A Stop so composed and having attached to the C C key a pipe that gives the C C or 8-feet sound, as in the Stopped Diapason, is a Stop of 8-feet *tone;* one giving the 16-feet sound, as in the Bordun, is a Stop of 16-feet *tone.*

491. Some incomplete and short Stops are, as already explained, without pipes to the 8-feet octave of keys; the size of which, therefore, is calculated in another way, viz. by their pitch, so far as their compass *does* extend. An Open Diapason or Dulciana, for instance, that stops at tenor or 4-feet c, is nevertheless an 8-feet stop *as far as it goes.* The circumstance of its longest pipe measuring but 4-feet arises from the omission of the entire 8-feet octave; the introduction of which would make the true standard length of the stop quite apparent. Even a Clarabella to middle c^1 (2-feet *length*) is an 8-feet stop so far as it extends; but is without both the 4 and 8 feet octaves of pipes.

492. To be a 4 or 2 feet *stop,* the 4 or 2 feet pipe must be on the C C or 8-feet *key.* The 4-feet pipe on the 4-feet key, as in the case of a tenor c Dulciana, or the 2-feet pipe on the 2-feet key, as in a middle c^1 Clarabella, still leaves the sound in unison with the Diapasons, so far as any sound at all can be obtained, and is therefore of unison or 8-feet pitch.

The classification of the stops, in regard to their tone-producing part, into reed stops and flue stops.

493. The peculiarity by which the two great classes of organ pipes are distinguished has been already so fully explained, that it is only necessary to add, in this place, that the same classification is observed with the Stops, and that a Reed-stop is a series

of pipes which speak through the medium of a reed and tongue; and a Flue-stop, a similar series of lip pipes.

494. Among those of the former class of Stops are included the Trumpet, Clarion, Double Trumpet, Horn, Cornopean, Trombone, Hautboy, Bassoon, Clarionet, and Vox Humana stops; among the latter, the Diapasons, Principal, Fifteenth, the Mixtures; and, in short, all the stops that are not included in the forementioned class.

Classification of the flue-stops, in regard to certain peculiarities in their structure, into Diapason-work, Covered-work, and Flute-work.

495. The several kinds of Flue-stops are so numerous, and some kinds are so much more important than others, and require to be introduced in so much greater abundance, that, for the sake of recognition, they are conveniently distributed and arranged under three separate heads. Flue-stops are therefore grouped into

Diapason-work	(Principal-werk),
Covered-work, and	(Gedact-werk),
Flute-work	(Flöte-werk).

496. *Diapason-work.* Under the head of Diapason or Principal-work are placed all the open cylindrical stops of Open Diapason measure, or which have their scale deduced from that of the Open Diapason; such stops are the chief, most important, or "*principal*," as they are also the most numerous, in an organ; and hence the origin and appropriateness of the term under which stops of this shape and proportion are classed*. The Unison, and Double Open Diapasons, Principal, Fifteenth, and Octave Fifteenth; the Fifth, Twelfth, and Larigot; the Tenth and Tierce; and the Mixture Stops, when of full or proportionate scale; belong to the Diapason-work.

497. *Covered-work.* This class comprises all stops composed of pipes that have their bodies stopped, closed, or covered at the upper end. The Unison and Double Stopped Diapasons (Bordun), the Stopped Flute, and the Stopped Piccolo, therefore, are members of the Covered-work.

498. *Flute-work.* This division includes all Flue-stops of whatsoever kind or shape, that do not come under either of the preceding divisions.

499. All four-sided pipes, therefore, that are open at the top, and so distinguished from the Covered-work, belong to the "Flute-work;" a term adopted for convenience of classification, and not intended to imply that all the Stops arranged under that head produce a *flute quality of tone.* The "Diapason" and "Covered" Stops have occasionally been included with the above, under the one general term "Flute-work;" but "Flute" stops are never placed under the head of "Diapason," or "Covered"-work.

500. The Clarabella, Wald-Flute, Hohl-Flute, Oboe-Flute, Suabe-Flute, the English and German Gambas, the Flageolet, Keraulophon and Piccolo stops, therefore, belong to the "Flute-work." Also the Conical stops, as Spitz-Flote and Gemshorn; and all Stops of cylindrical shape, the scale of which is either *below* or *beyond* that of the Diapason-work, as the Dulciana of 16, 8, and 4 feet, the Block-flute, &c.

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* Concerning the merit of the term "Diapason," see sections 523, 524, and 525, page 114.

Classification of Organ Stops, in regard to the sound they produce, into Foundation, Mutation, and Compound Stops.

501. A third classification of organ Stops is made, in regard to the *sound* they produce; i. e. whether that accords with the key struck or not. The three divisions into which the Stops are thrown for this purpose are,

Foundation Stops,
Mutation Stops, and
Compound Stops.

502. *Foundation Stops* are such as produce a sound corresponding with the key pressed down; that is to say, that give the C sound when the C key is touched. They are so designated, because their sound is the very "foundation" of the organ tone; so much so, that such Stops cannot be dispensed with, and therefore receive priority of selection: without them, and that in good proportion, the tone of an organ would be confused and undefined; although they again are, to a certain extent, dependent on members of the other classes of stops for a complete and satisfactory result. The Foundation-stops are of various lengths, consequently their sound may be high or low; but this does not affect their *classification*, so long as the key and the name of the sound agree. They are of 32, 16, 8, 4, 2 feet, and 1 foot in length or sound; and include members of all classes of Stops; Reed and Flue; Open and Stopped; Diapason, Covered, and Flute-work; the chief conditions being that they are of the lengths the size of the tone indicated above.

503. The 8-feet Stops on the manual and the 16 on the pedal are called the Chief Foundation Stops, as being the unisons of their respective departments, and giving the "ground-tone." All the 4-feet on the manual and 8-feet on the pedal are classed as Octave Stops; and those of 16-feet on the manual and 32 on the pedal, as Double Stops.

504. *Mutation, or Filling-up Stops* do *not* give a sound corresponding with the key pressed down; but some sound g on the C key, others e. Those giving the fore-mentioned sound are called "fifth-sounding" or Quint Stops; those giving the latter, "third-sounding" or Tierce stops. They are of various lengths, like the Foundation-stops; the size, or size of tone, of the Fifth-sounding Stops being as follows: $10\frac{2}{3}$ (12), $5\frac{1}{3}$ (6), $2\frac{2}{3}$ (3) feet, and $1\frac{1}{3}$ ($1\frac{1}{2}$) foot.

505. An open Stop of $5\frac{1}{3}$ feet on the manual, or $10\frac{2}{3}$ on the pedal, sounds the *fifth* above the Unison Stops of those departments respectively, and is called the Fifth. One of the $2\frac{2}{3}$ feet on the manual, or $5\frac{1}{3}$ on the pedal, gives the octave of the fifth, or the Twelfth, by which name it is hence called. A Stop, sounding the second octave above the fifth, that is, a *nineteenth* above the unison, measuring $1\frac{1}{3}$ on the manual and $2\frac{2}{3}$ feet on the pedal, is called the *Larigot*. A still smaller rank of fifth-sounding pipes, speaking a *twenty-sixth* above the unison tone, is often included among the ranks of the manual Compound-stops; where, indeed, the last-mentioned series is more frequently met with than as a separate Stop.

506. In German organs, the fifth-sounding Stops are called "Quints," in reference to the *sound* they produce. The *pitch* of that sound is not usually indicated by any peculiarity in the name on the draw-stop, but by the length being marked in figures. See Foreign Specifications, 2, 60, 78, 89.

507. The lengths of the Third-sounding Stops or Tierces are $6\frac{2}{5}$, $3\frac{1}{5}$ feet, and $1\frac{3}{5}$ foot.

508. An Open-stop, measuring $3\frac{1}{5}$ on the manual, or $6\frac{2}{5}$ on the pedal, gives the major-third above the Octave-stops, or the *tenth* above the unison, and is called the Tenth. One measuring $1\frac{3}{5}$ foot on the manual, or $3\frac{1}{5}$ on the pedal, sounds a major-third above the Super-octave Stops, or a *seventeenth* above the Unison Stops, and is called the Tierce.

509. The Mutation-stops impart a certain roundness and fulness to the general organ-tone, by "filling up" some of the bare octave sounds of the Foundation-stops, by the mixture therewith of certain intermediate, harmonical sounds, of fixed and determinate pitches. They also have the further effect of binding together the extreme sounds of the Compound-stops, and the Unison and Double Stops; and of blending the whole into one great mass of musical sound. The laws which regulate the admission of Mutation-stops, and decide which are required and which are not, are fully explained in a subsequent chapter.

510. *Compound or Mixture Stops.* The stops which have 1 pipe to each key, have been termed "simple" stops. The kind now under consideration are called "Compound" Stops, because they have more than 1 pipe to each key, often 5; and "Mixture" Stops, because those several pipes consist of certain members of the two preceding descriptions of Stops, "mixed" or "compounded" together. These little pipes are so uniformly required to be used in conjunction, that they are generally made to draw in groups; hence the formation of Compound-stops. The Compound-stops give to the Foundation-stops a distinctness and clearness of effect in the bass, especially necessary to the quick enunciation of the larger pipes; and great vivacity as well as a kind of ringing character to the general organ-tone.

CHAPTER XXII.

THE NAMES OF ORGAN STOPS.

The name and description of stops found in English organs; together with their length or size of tone on the manual and pedal.

511. A COMPLETE list of stops usually found in English organs will now be given. Among the names inserted therein, will occasionally be found one of continental origin, and for which no English equivalent is known to exist. Where this is the case, of course the original name has been allowed to stand; but where a translation of the foreign name could be given, this has been added within brackets. It has happened that, in a few instances, continental names have been applied by English organ-builders to Stops of somewhat different construction or character of tone, which will be duly pointed out.

512. With regard to the *arrangement* of the stops mentioned in the list, the flue and reed species have been treated separately, priority being given to the former; and the members of each have been taken in the order of their length or their size of tone, commencing with the largest, and ending with the smallest.

513. *Sub-Bordun, Manual-Untersaz.* This Manual stop is composed of stopped pipes, and is, in pitch, two octaves below the unison or 8-feet stops: it is therefore of 32-feet tone. The Sub-Bordun is best suited for organs of the first magnitude, in which it has a grand effect. Its compass is usually to middle c^1, fiddle g, or, at most, to tenor c. Examples will be found in Foreign Specifications, Nos. 23, 40, 64, 70, &c.; also in the organ at St. Olive's, Southwark, built by Lincoln, which however has open pipes in the treble.

514. *Double Open Diapason.* This Stop belongs to the "Diapason-work," and is of 16 feet length on the manual, and 32 on the pedal. It is made either of tin, metal, zinc, or wood. The manual Double Open Diapason is most frequently made of metal, in this country, and is sometimes continued right down in metal, as is the case in the organ at Brunswick Chapel, Leeds, built by Booth of Wakefield; one of G G compass, where the largest metal-pipe is consequently $21\frac{1}{3}$ feet in length. In some instances, the lower half-octave, or octave of pipes, are of wood,—as in that of the late St. George's Church, Doncaster,—from F F F to C C C. In other specimens, the pipes, to the lowest octave or so, are omitted and stopped pipes, substituted to save room or expense; or the Stop is altogether discontinued below the tenor c key. In the latter case, the stop is on that account called *Tenoroon**. The oldest authentic specimen of the Double Open Diapason known to exist in England, is the one in the very interesting organ in Exeter Cathedral, made by Loosemore, in $166\frac{4}{5}$. The instrument just named, together with that in St. Saviour's, Southwark, made by Schwarbrook, were the only two organs in this country that possessed a Double *Open* Diapason until of late years.

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* See note, *ante*, page 102.

515. The Pedal Double Open Diapason is made of either of the four materials mentioned above. Specimens of wood Stops of this kind occur at Westminster Abbey; at the Parish Church and at Brunswick Chapel, Leeds; at York Minster; and at the Birmingham Town Hall. The instruments in the two last-mentioned edifices have also each a 32-feet Stop of this description made of zinc; while 32-feet Stops of tin occur at Haarlem, Hamburgh, &c. The pitch of the Double Open Diapason, whether of the Manual or Pedal, is an octave below the Unison Stop.

516. *Double Dulciana.* An open metal cylindrical Stop, belonging to the Flute-work; of small scale and delicate tone, and somewhat slow of speech. It is a Manual Stop of 16-feet, of which but a few specimens have been made in a complete form. There is one, however, in metal throughout, to the 16-feet pipe, in the Choir organ of the large instrument at Brunswick Chapel, Leeds. Occasionally the pipes, to the lowest octave or octave and a half of keys, are of stopped wood, as in the Swell at Christ Church, Newgate Street; though more frequently there are no pipes at all provided for the lowest octave keys; in which case, the Stop is usually called Tenoroon Dulciana.

517. *Double Stopped Diapason*, or Bordun; on the Pedal, Sub-Bordun, or Untersatz. This is a Covered-stop, of 16-feet tone on the Manual and 32 on the Pedal. It is, rightly, a whole stop, like the two preceding; complete specimens occurring on the Great Manual organs at St. Luke's, Old Street; the Exchange, Northampton; All Saints', Northampton; and at St. Michael's, Chester Square; &c. In many organs which have a Tenoroon Open Diapason or Dulciana, the Double Stopped Diapason consists of one octave only of pipes, producing the 16-feet octave of sounds, acting on the 8-feet octave of the Manual, commencing where the Tenoroon leaves off. The English Double Stopped Diapason is generally made of wood throughout. This is the case also with many continental specimens (see Foreign Specifications, Nos. 41, 48, &c.); while others again are either wholly or in part of metal (see Nos. 55, 62, &c.). Of the Manual Double Stopped Diapason, numerous specimens were in existence in this country about the middle of the last century. The organ built by Jordon, Bridge, and Byfield, in the year 1740, for the church at Great Yarmouth, had a Stop of this kind. So also had the organ in the Foundling Hospital (constructed by Parker, and erected in 1759), which however extended no farther than through the lowest octave and a half of the Great Manual. The instrument at St. Margaret's, Lynn, made by Snetzler, in 1754, originally contained one throughout the Great Organ; and another, by Schwarbrook, formed part of his masterpiece at St. Michael's, Coventry. Dr. Hawkins, in his History of Music, mentions another specimen as occurring in an organ at Manchester (at the Cathedral) in his time.

518. The Pedal Double Stopped Diapason (32-feet tone) appears to have been introduced, for the first time in this country, by Smith of Bristol, in the organ he built for the church of St. James in that city, in 1824. Its usefulness is gradually being recognized, and its calm, deep, and religious effect justly appreciated. Other examples of the Stop occur in organs at the Temple, and St. Olave's, Southwark, in the latter of which it is called Sub-Bourdun, 32-feet tone; and at Trinity College, Cambridge.

519. *Pyramidon.* This is a Pedal stop of 16 or 32 feet tone, invented by the Rev. Sir Frederic Ouseley, and made by Mr. Flight; the peculiarities in which con-

sist, first, in the shape of the pipes, which are more than four times the size at the top than they are at the mouth; and, secondly, in their producing sounds of remarkable gravity for their size. From a pipe, measuring only 2 feet 9 inches in length, 2 feet 3 inches square at the top, and 8 inches at the block, the C C C or 16-feet sound is obtained. The quality of the tone resembles that of a stopped pipe.

520. *Open Diapason.* The Open Diapason is the chief member of the "Principal"-work. It is a whole stop, of 8 feet on the Manual, and 16 feet on the Pedal; and is called Open in contradistinction to the Stopped Diapason, the pipes of which are closed or covered in at the top. From its being the chief Foundation-stop on the Manual and Pedal, its goodness or badness exercises an important influence over the effect of the organ generally. The Manual Open Diapason is generally formed of tin or metal pipes, many of which are those usually seen in front of the case. Sometimes the lowest half-octave or octave of pipes are made of wood.

521. Large organs frequently have two Open Diapasons on the Great Manual; of tin or metal throughout, usually, in old instruments, but with the bass of the second one of wood, in many later organs. When the organ is placed on the choir screen, as is often the case in cathedrals and other cruciform structures, the majority of the pipes of one *Open* appear in the east, and those of the other in the west front of the case. The second Open Diapason is made to a different scale from the first, usually one pipe smaller, to destroy the sympathy.

522. The Pedal Open Diapason is almost invariably made of wood. Metal ones, however, are sometimes met with; as in the Pedal organs at St. Sepulchre's, Snow Hill; Christ Church, Newgate Street; Exeter Hall; St. John's, Chester; &c.

523. It may be worth while to mention here, that the use of the word "Diapason" has in some instances been objected to, as having no definite signification; and its retention as a name for an organ stop proposed to be discontinued in consequence. There seems, however, to be no sufficient reason for discarding it.

524. That it is no longer applicable in its *original* signification, is indeed true. The word, which is of Greek origin, means an "octave;" and, applied to the first pneumatic organ, which is recorded to have had but *one octave* of pipes, and those only of the diatonic scale, offered the most fit name that could have been given. But, in proportion as the subsequent increase in the compass of the organ and the number of its Stops took place, the appropriateness of the term in its *original* sense decreased.

525. These developments, however, prepared the way for the application of the word in a more extended meaning. The term "Diapason," coming as it does from two Greek words, signifying "through all," is applied by makers of musical instruments to the rule, standard, or scale by which they make their Flutes, Hautboys, &c. In a similar manner, the set of Unison Open pipes under consideration forms the rule, standard, or scale by which the organ-builder regulates the size of the harmonic series of stops; not only in the first instance, in regard to their length and breadth of body, but afterwards, in regard to their strength and quality of tone. Its influence extends "through all" the Stops in question; hence, the name "Diapason" appears to be just the most appropriate one that could be given to a set of pipes exercising so much power.

526. *Dulciana.* This is an 8-feet Manual Stop, belonging to the flute-work. It is sometimes of metal throughout, as at St. Giles's, Camberwell; or the

lowest octave is made of wood and the remainder of metal, as at St. Dunstan's, Fleet Street. The Dulciana, in most organs, stops at tenor c; the Stop then frequently being grooved into the Stopped Diapason in the 8-feet octave; or the bass of the Stopped Diapason is made to draw separately to meet it. The pipes of the Dulciana are much smaller in scale than those of the Open Diapason, the fiddle g, or tenor f sharp pipe of the former, being of the same diameter as the middle c^1 pipe of the latter; and its tone is peculiarly soft and gentle.

527. The Dulciana stop was either invented or introduced into this country by Snetzler, who acquired great reputation from the entire success that attended his first public specimen, which forms a portion of the organ erected by him, in the year 1754, in St. Margaret's Church, at Lynn, in Norfolk.

528. *Harmonic Flute.* (See Foreign Specifications, Nos. 12 and 13.) This is a Manual open metal Flue-stop, extending to fiddle g, or tenor c, at the farthest, of cylin-lindrical form, of 8 or 4 feet pitch, and blown by a heavy wind; it is sometimes simply copiously winded. The pipes are of double length; i. e. 16 or 8 feet; and the bodies have a hole bored in them, midway between the foot and the top. The tone of the Harmonic Flute is exceedingly full, fluty, and powerful, and imparts great breadth and thickness to the general organ-tone. It was invented by Cavaillé Coll of Paris, and has lately been introduced by Hill, and also by Davison, into their organs at the Panopticon, Leicester Square, and at the Town Hall, Glasgow. The upper pipes of the Harmonic Flute sometimes blow the *second* octave above, and are accordingly *four* times their speaking length.

529. *Voix Celestes.* (See Specifications, No. 13.) The Voix Celestes is another stop of French invention, formed of two Dulcianas; which are first tuned in unison, and then the pipes of the second one are lightly touched again with the tuning-horn, and their pitch slightly raised. This gives to the tone of the Stop a waving, undulating character; which, in this respect, resembles the German Stop called *Unda Maris* (wave of the sea), which will be found mentioned in Specifications, Nos. 79, 80, &c.

530. The Voix Celeste was first employed in England in the Panopticon and Glasgow organs.

531. *Stopped Diapason.* The Stopped Diapason is an 8-feet sounding Stop on the Manual, and 16 on the Pedal. It is the most important member of the Covered-work,—its sound being in unison with that of the Open Diapason. The Manual Stopped Diapason is sometimes composed of metal pipes as far as tenor c, and of oak thence downwards, as on the Great Manual at the Temple Church; or of metal to middle c^1, and of deal below, as at Christ Church, Spitalfields. More frequently, however, it is of wood throughout. The different materials slightly modify the tone; which may, in general terms, be described as being fluty and mellow.

532. On the Pedal, the Stopped Diapason is generally made of wood. Its tone adds a quiet solidity to that of the Pedal Open Diapason.

533. *Clarionet Flute.* This Stop is formed much after the manner of a Stopped Diapason, except that the perforations in the stoppers are much larger, and its tone is of a very agreeable, reedy quality. It is of 8 or 4 feet tone on the Manual. A Stop of this kind, labelled Flute, occurs on the Great Manual of an organ at Cheetham Hill, built by Elliott, in 1811.

534. *Clarabella.* The modern Stop thus called, which was invented by Bishop, is of 8 feet on the Manual. It is formed of open wood pipes of a large scale, producing a thick and powerful fluty tone; and is sometimes introduced instead of the treble portion of the Stopped Diapason. The Clarabella is seldom disposed otherwise than as an Incomplete stop; its compass generally only extending to middle c^1, or, at most, to tenor c. A complete one, however, occurs in the Swell of the Brunswick Chapel organ, Leeds, by Booth of Wakefield.

535. The English Clarabella much resembles the German "Hohl-flöte" in character of tone, except that its sound is scarcely so strong or so full.

536. *Dolcan.* This is an Open Manual Stop, of 8 feet, the pipes of which are of larger diameter at the top than at the bottom, producing a very agreeable tone. It is not much known in England; a specimen, however, exists in the organ at St. Stephen's Church, Westminster, made by Hill.

537. *Viol di Gamba*, or *Gamba.* This is one of the most highly esteemed and most frequently disposed Stops in continental organs; as may be gathered from reference to the Foreign Specifications in the Appendix. The German Gamba is usually composed of cylindrical pipes, of small scale, well cut up; though, occasionally, it is formed of conical pipes. In England, the Viol di Gamba was, until very recently, made exclusively of the conical shape, surmounted by a bell, as represented in fig. 76, page 79; and which kind of pipe was first introduced by Mr. Hill.

538. In compass, the Viol di Gamba usually descends no lower than tenor c; that at Christ Church, Spitalfields, however,—which is a Bell Gamba,—descends to C C. Examples of the German Gamba occur in the Exchange organ, at Northampton, and in the organ at the Temple Church, the latter specimen descending to C C.

539. The tone of the Bell Gamba is very agreeable and reedy, and quick in its articulation; while that of the (German) Gamba is much stronger, pungent, and cutting, but of slower intonation (imitating the bite of the bow on the string), hence the latter has the Stopped Diapason always drawn with it, which performs the same office, in regard to this and all other slow-speaking Stops, that the "percussion" does to the tongues of Harmoniums.

540. *Keraulophon.* This also is a manual stop of 8 feet, of metal, and, like the one last noticed, of a reedy and pleasing quality of tone. It seldom extends lower than tenor c. It is formed of cylindrical pipes, like the Open Diapason and Dulciana, the peculiarity in the character of the tone being produced by the boring of a small round hole in the body of the pipe near to the top, or through a sliding cap. The Keraulophon was invented by Messrs. Gray and Davison, and used by them for the first time in the organ at St. Paul's Church, Knightsbridge, built in 1843.

541. *Hohl-flute* (Hollow-toned Flute). A German name, applied of late years to an English open metal Stop of 8 feet, that is nearly identical with the Stop last described.

542. The Hohl-flute was occasionally introduced by Father Smith into his organs. There were originally *two* in his instrument at Durham Cathedral, one on the Great and the other on the Choir manual, each of wood; both of which, however, have long since disappeared. That introduced by the same builder into the Choir Organ at the Cathedral, Manchester, still remains, under the name "Dulciana." The German Hohl-flute, when of metal, is made to a very large scale; i. e. larger than

the Open Diapason, producing a powerful and thick, or, as the name distinctly intimates, a *hollow* tone. There is a Hohl-flute in the organ erected by Schulze, in 1851, in the Exchange at Northampton, of wood, and having the mouth on the broad side of the pipe.

543. *Geigen Principal* (Violin Diapason) is a manual stop of 8 feet, producing a pungent tone, very like that of the Gamba, except that the pipes, being of larger scale, speak quicker and produce a fuller tone. The Stop is not much known in England—two specimens, of 8 and 4 feet, however, occurring on the Choir manual in the Exchange organ at Northampton.

544. *Salicional, or Salicet.* Another reedy-toned 8-feet Manual Stop, of small scale, of which an example occurs in the Swell of the Panopticon organ. It may not be uninteresting to many to have the peculiarities of the several string-toned Stops briefly pointed out:

The fiddle g, ——————Geigen Principal,
tenor d sharp,——————Gamba, and
tenor c sharp,—of the Salicional, are all of the same diameter as the middle c^1 ———of the Open Diapason; i. e. $1\frac{7}{8}$ in.

545. All the above-named Stops differ in respect to the "height of mouth;" the *smallest* in scale (the Salicional) being cut up *most*, and the Open (the *largest*), the *least*. Moreover, they differ very much in their speech; the Salicet being the slowest, but the most penetrating; the Open, the quickest and fullest.

546. *Fifth—Quint. Double Twelfth—Diapente.* The Fifth is the longest mutation stop commonly introduced into an organ. On the Manual, it is sometimes composed of open pipes of proportionate scale to the Double Open Diapason, in which case it of course forms a portion of the "Diapason-work;" at others, it consists of stopped pipes, as in the Chester Cathedral Organ, built by Gray and Davison, and in St. Margaret's Church, Gotha, built by Schulze—when it belongs to the Covered-work (Gedact-Quint: see Foreign Specifications, Nos. 6, 43, &c.). In a few English examples, the Manual Quint has been formed of Dulciana pipes, which, however, are of weak intonation, and less prompt in speech. The Quint on the Pedal is almost invariably composed of stopped pipes, and are most effective. (See Specifications, Nos. 1, 52, 63, 65, 71, 83, &c.). The greatest size of the Quint is usually $5\frac{1}{3}$-feet on the Manual, and $10\frac{2}{3}$-feet tone on the Pedal. In the Cathedral organ, however, at Bremen, built by Schulze, is a "Quinten-Bass" of $21\frac{1}{3}$-feet tone, of stopped wood pipes. (See Appendix, No. 64.)

547. A Manual Open Quint was made in England so long back as the year 1730, by Bridge, the organ-builder, who introduced it into the instrument erected by him in Christ Church, Spitalfields, in that year. The Pedal Stopped Quint, $10\frac{2}{3}$-feet tone, was first introduced into this country by Robson, in the organ at Huddersfield, built in 1850. A second specimen was introduced by Kirtland and Jardine, with excellent effect, into their organ in Holy Trinity Church, Manchester, made in 1852.

548. *Principal Octave.* A 4-feet Stop on the Manual, and 8 feet on the Pedal. Its usual material is either tin or metal, though, in some organs, where there are two Principals on the Great Manual, the second one is sometimes of wood, as at Christ's Hospital, the Chapel Royal, St. James's, &c.; the second one is then more correctly

an open wood Flute of 4-feet. At St. Sepulchre's; St. Giles's, Camberwell; Christ Church, Spitalfields; &c. both Principals are of metal. The English Principal is the octave stop to the Open Diapason; and where there are two metal Principals, the scale of the second one is generally regulated by the measure of the second Open Diapason, to which Stop it is usually designed to form an appropriate octave.

549. *Dulciana Principal—Dulcet.* A delicate and sweet-toned Manual Stop of 4 feet, formed of metal pipes, of small scale. It was first introduced by Green, who, in several of his later instruments, placed this, as well as a unison Dulciana, in the Swell. Examples occur, thus disposed, in the organs erected by him at Rochester and Salisbury Cathedrals, Greenwich Hospital, &c.

550. *Flute.* A stop of either 4-feet standard length or 4-feet tone on the Manual (for both species of Stop are met with indifferently and indiscriminately under the same name), and 8-feet tone on the Pedal. The old Flute Stops are sometimes composed of metal pipes throughout, as in the Choir organ at the Temple Church; St. Andrew's, Undershaft; and, until lately, at St. Paul's; sometimes partly so, as at St. Michael's, Cornhill; while in many instances they are of wood throughout, as at Finedon. The old organs often have a Flute Stop of octave pitch on both the Great and Choir Manuals. Where this is the case, one is often of metal, either wholly or partially, and the other of wood, the different materials being used as an auxiliary to secure an individuality in the character of the tone of each. The majority of the modern Flute Stops are of wood, and open; and hence are 4-feet Stops, as those already noticed are of 4-feet tone.

551. The quality of the tone of a Flute Stop usually bears a close resemblance to that of the wind instrument after which it is named.

552. As a Pedal stop, the Flute has not as yet been much used in this country, although it is of the greatest utility. A Bass Flute Stop occurs in the organ at St. Mark's, Hamilton Terrace, Regent's Park, built by Gray, in 1847.

553. *Spitz-flute* (literally, pointed or spire-flute). This Stop is found of 8, 4, and 2 feet length in German organs. (See Foreign Specifications, Nos. 49, 75, &c.) In England, it has hitherto been made chiefly as a 4-feet Stop; i. e. of principal pitch, as in the Choir Organ at the Temple Church. The pipes of the Spitz-flute are slightly conical, being about $\frac{1}{4}$ narrower at top than at the mouth, and the tone is therefore rather softer than that of the cylindrical stop, but of very pleasing quality.

554. *Gemshorn.* The Gemshorn is a member of the Flute-work, and is met with of 8, 4, or 2 feet length in continental organs. (See Appendix, Nos. 3, 5, &c.). A Stop of this kind, of 4 feet, occurs on the Choir Manuals of the organs at the Panopticon, and at the Wesleyan Chapel, Poplar, built by Mr. Hill; and of 2 feet in the Choir organ at the Temple Church. The pipes of this Stop are only $\frac{1}{3}$ the diameter at the top that they are at the mouth; and the tone is consequently light, but very clear and travelling.

555. *Nason.* This name is sometimes found applied in old organs to a wood-stopped Flute of 4-feet pitch on the Great Manual, as at the Temple Church; and, until a few years since, at St. Paul's Cathedral. It is generally a very quiet and sweet-toned Stop, producing a most lovely effect when combined with the Diapasons.

556. *Wald-flute* (Wood or Forest-flute). The name given in England to a Manual Stop of 4 feet, formed of open wood pipes of a large scale, with inverted

mouths. It is a full-toned and powerful speaking Stop, and, in all essential particulars, may be considered as an octave Clarabella. It seldom ranges lower than tenor c. Mr. Hill first used it in the Cheetham Hill organ, Manchester, built by him in 1841. The English Wald-flute is a distinct Stop to the German one of the same name. The German Stop is made either of tin, metal, or wood; the English one always of the last-mentioned material. The former is also made to a scale larger than that of the Open Diapason, and produces a thick and full tone.

557. *Clear-flute.* An open wood flute of 4 feet, invented by the firm of Kirtland and Jardine, of Manchester. It resembles the Wald-flute so far, that the pipes have the inward-bevelled mouth; but, in addition to this, they have also the bevelled block, shown in fig. 94, page 90; are copiously winded, have no nicking, and are more nearly square in shape. The tone is exceedingly firm, clear, and full.

558. *Oboe-flute.* Another 4-feet Manual Stop, composed of wood pipes of small scale. Its usual range is to tenor c. The tone of the Oboe-flute is very delicate and reedy, and not so strong as that of the Viol di Gamba.

559. *Suabe-flute.* Also a tenor c Manual Stop of 4 feet, formed of wood pipes, with inverted mouths. Its tone is liquid and clear, and not so loud as the Wald-flute. The Suabe-flute was invented by Mr. Hill.

560. *Celestina.* A 4-feet Manual Stop, formed of open wood pipes, of small scale, producing a very delicate and subdued tone. It is not often met with. Its usual place is in the Swell organ; as at Christ's Hospital, and the Chapel Royal, St. James's.

561. *Tenth—Double Tierce—Decima.* This is an open metal cylindrical Stop, of $3\frac{1}{5}$-feet length on the Manual, and $6\frac{2}{5}$-feet on the Pedal. It is the second Double Mutation Stop, taking them in the order of their size or gravity of tone; but the largest of the third-sounding species. The first English organ in which the Tenth was legitimately introduced, is the one in the Mechanics' Institution, Liverpool. The pitch of the Tenth is a major third above the Principal, or a tenth above the Diapasons; all *numerical* names giving the altitude of the sound above that of the unison Stops.

562. *Twelfth—Duodecima.* An open metal stop, of $2\frac{2}{3}$ feet on the Manual, and $5\frac{1}{3}$ feet on the Pedal, belonging to the Diapason-work. Its pitch is a perfect fifth above the Principal, or a twelfth above the Diapasons.

563. *Fifteenth—Super-octave.* Also an open metal Stop belonging to the Diapason-work, of 2-feet length on the Manual, and 4-feet on the Pedal. The Fifteenth sounds the octave above the Principal, and consequently a fifteenth, or super-octave, above the unison Stops. In some organs, where there are two Fifteenths on one Manual, the second is made of wood, as at the Chapel Royal, St. James's, forming, in fact, a Piccolo; at Christ Church, Spitalfields, both the Fifteenths on the Great Manual are of metal.

564. *Block-flute* (common or ordinary flute). This is an open metal Stop, tuned in unison with the Fifteenth. It is composed of pipes of a very large scale, the 4-feet c pipe measuring very nearly $4\frac{1}{2}$ inches in diameter, the measure of the 4-feet pipe of the Open Diapason being about $3\frac{1}{2}$ inches. The tone of the Block-flute is very full and broad.

565. The Block-flute was a favorite Stop with Father Smith, who introduced it

into the Durham and St. Paul's Cathedral organs. The former specimen has disappeared; the latter still remains, under the name "Large Fifteenth."

566. *Piccolo.* A 2-feet Manual Stop, formed of wood pipes, producing a bright, clear, and travelling tone. Its pitch, as its accordance of length thereto would imply, is in unison with the Fifteenth; i. e. two octaves above the Diapasons. The Piccolo is sometimes a Whole-stop, as at St. Michael's, Chester Square; but more often it only extends to tenor c.

567. *Flageolet.* Another small member of the Flute-work, usually of 2 feet on the Manual. It is formed of open wood pipes, and the tone is smaller and sharper than that of the Piccolo.

568. *Tierce—Seventeenth.* A Stop formed of open metal cylindrical pipes, the pitch of which is a major third above the Fifteenth, or a seventeenth above the Diapasons. The Tierce frequently constitutes one of the ranks of the Sesquialtera, though, in old organs, it is occasionally made to draw separately, as at St. Sepulchre's. It is, however, found in both ways, in ancient as well as modern instruments.

569. *Larigot—Nineteenth—Octave-Twelfth.* This also is a small metal Mutation-stop, of $1\frac{1}{6}$ foot on the Manual, and $2\frac{1}{3}$ on the Pedal. It is occasionally met with as a separate Stop, as at Christ Church, Spitalfields, and St. Sepulchre's; but generally it is embodied in the Sesquialtera, of which it forms, strictly speaking, an integral part. The Larigot sounds a perfect fifth above the Fifteenth, and therefore a nineteenth above the Unison Stops.

570. *Octave-fifteenth—Twenty-second.* A small open metal Stop, of 1 foot on the Manual and 2 feet on the Pedal, of bright and sharp tone. It sounds the octave above the Fifteenth, and the third octave above the Diapasons. This rank of pipes, like the Tierce and Larigot, is but seldom disposed as a separate stop. It occurs in this manner in the organs at St. Philip's, Sheffield, and Stratford on Avon. A "Two-and-twentieth" also appears as one of the Stops in the original specification for the old organ at York Minster, built by Dallam, in 1633.

571. *Doublette.* The French name for the Fifteenth; but in England applied, of late years, to a two-rank Foundation-stop, sounding a fifteenth and twenty-second above the unison, the two sounds being an octave apart.

Compound Stops.

572. *Sesquialtera.* This Compound-stop is composed of either 5, 4, 3, or 2 ranks of open metal pipes, tuned in thirds, fifths, and octaves to the Diapasons. The altitude of the several sounds of a 5-rank Sesquialtera above the unison pitch, would, under ordinary circumstances, be, in the bass, a 17th (3), 19th (5), 22nd (8), 26th (5), and 29th (8), from the ground tone. Where, however, there is a separate Tierce, it is not usual to include a duplicate of that rank in the Sesquialtera, unless, indeed, the ranks of mixture are sufficiently numerous to demand this arrangement. At Doncaster, where there was a Tierce and a 5-rank Sesquialtera, the latter was compounded of a 19th (5), 22nd (8), 24th (3), 26th (5), and 29th (8): that is, with an octave Tierce in lieu of the unison (separate) one. Another composition for a 5-rank Sesquialtera with separate Tierce, is—15th (8), 19th (5), 22nd (8), 26th (5), and 29th (8). A 4-rank Sesquialtera is generally, though not always, composed of a 15th (8), 17th (3), 19th (5), and 22nd (8), as at St. Mary's, Nottingham (Snetzler), and at St. Botolph's, Aldgate. Sometimes it con-

sists of a 17th (3), 19th (5), 22nd (8), and 24th (3) (Tierce and octave Tierce), as at St. Magnus, London Bridge. This again, and indeed all Sesquialteras, however numerous or few may be the number of ranks of its pipes, are, in regard to their composition, influenced very much by the presence, or otherwise, of the Tierce, the Larigot, the temperament to which the organ is tuned, and even also by the occurrence, or not, of other Compound-stops on the same Manual.

573. As the pipes of the Sesquialtera would become exceedingly small, keen, and prominent in the treble, and, moreover, their presence is not demanded by the acoustical phenomenon on which the introduction of the Compound-stops is founded, as is fully explained in a succeeding chapter—the smaller ranks are usually discontinued from middle c^1, or c^1 sharp, at their original altitude of pitch above the Diapason, and larger pipes, sounding an octave lower, are substituted. In this manner the Twenty-second or Octave-fifteenth, the smallest rank in a Sesquialtera of 3 ranks, is turned into a Fifteenth, and the Nineteenth, or Larigot, into a Twelfth. The Tierce is usually allowed to remain unbroken throughout the Manual.

574. In consequence of these "breaks," as they are termed, there are then of course two Twelfths and two Fifteenths in the treble. All such duplicate ranks are, in England, usually made to a different scale.

575. The German Sesquialtera, when of 2 ranks, is composed of a Twelfth and Tierce, sounding a major sixth.

576. *Mixture.* This Stop consists of from 5 to 2 ranks of open metal pipes, which are, in England, generally of smaller dimensions than those of the Sesquialtera, particularly where the last-mentioned Stop is not very numerously ranked, and has nothing higher than a 22nd.

577. The Mixture, then, if of two ranks only, usually consists of a 26th (5) and 29th (8) in the bass and tenor octaves; changing to a 19th (5) and 22nd (8) at middle c^1, or middle c^1 sharp; i.e. on the same key where the Sesquialtera breaks into a 12th, 15th, and 17th. In some Mixtures the breaks occur sooner; for instance, in Smith's, at the Temple Church, the Mixture breaks into a 19th (5) and 22nd (8) at tenor c sharp, and continues of that composition throughout the tenor octave. In some modern examples, on the contrary, both the Sesquialtera and Mixture are carried up to the smallest pipe commonly made, namely, f^5, occurring on the treble f^2 key in the Sesquialtera, and on the f^1 above middle c^1 key in the Mixture, before any break is made.

578. The Mixture of 5 ranks occurs the most frequently on such Manuals as have no other Compound-stop, as in the Swell at Christ Church, Newgate-street. In such cases its composition is nearly identical with that of a numerously ranked Sesquialtera, and closely resembles the Continental Mixture.

579. In Germany, the Mixture is usually the first Compound-stop, as the Sesquialtera is in England; and not the second, as we generally make it. Their second Compound-stop is generally either a Scharf (sharp) or Cymbel.

580. On the Great Manual of the organ in the Town Hall at Birmingham, is a 5-rank Mixture, besides a Sesquialtera and Furniture of the same number of ranks.

581. *Furniture.* This Compound-stop consists of from 5 to 2 sets of small open metal pipes, the number of ranks, as well as the intervals they sound above the unison Stops, varying with circumstances. Where there is a Sesquialtera and Mixture on

the same Manual, the Furniture is sometimes above both; as at St. Giles's, Camberwell. For instance, if it be of 2 ranks, they will probably be a 33rd (5) and a 36th (8) above the unison; i. e. a 5th and 8th above the (usual) upper rank of the Mixture; but the ranks will break in every octave, on account of even its longest pipes being but very small. In other examples, the Furniture is nearly identical in composition with the usual 3-rank Sesquialtera; as at St. Sepulchre's, and at the Panopticon. In many organs the Furniture appears as the second Compound-stop; as at St. Leonard's, Shoreditch, &c.; in which case it is nearly, if not quite, identical with the usual Mixture.

582. The Furniture, farther, appears occasionally on the Choir organ; as at St. Margaret's, Westminster; Croydon Church, &c. where it is capable of great effect.

583. *Cornet.* This name is applied to several distinct kinds of Stops.

584. *The Mounted Cornet* is a Compound-stop, consisting usually of 5 ranks of pipes, made to a very large scale, and voiced very loudly. It is only a treble stop in English organs, ranging from middle c^1 upwards; but in German examples, its usual compass is to tenor c. The Mounted Cornet is composed of a Stopped (or sometimes an Open) Diapason, a Principal, Twelfth, Fifteenth, and a Tierce. The pipes are planted on a small sound-board of their own, raised some 3 or 4 feet above that of the Great Organ—hence its name,—and the wind is conducted from the Great Organ sound-board up to that of the Mounted Cornet through metal tubes. The Mounted Cornet is almost entirely confined to old organs; and from many of these it has been removed. It was chiefly used for playing out the melody of the Corales upon, and for the performance of a now obsolete kind of voluntary, and is but seldom introduced into modern English organs, as its place, for all useful purposes, is well supplied by other Stops.

585. *Echo-Cornet.* This variety is also a Compound-stop, and is sometimes mounted. It is composed of the same number of ranks of pipes as the Mounted Cornet, and usually, though not always, of pipes of the same pitch, but of Dulciana scale. This Stop frequently extends to tenor c. Its usual situation is in the Swell, as at St. Peter's, Cornhill; its tone, besides being in itself light and delicate, being farther subdued by being enclosed within a box.

586. The name of Cornet is often found applied to the Compound-stop so frequently met with in the short Swells of the last century. It is generally of 3 ranks, 12th, 15th, and 17th; though, where there is no separate Principal, as at St. George's, Ratcliff Highway, that Stop is usually incorporated with it, which then of course contains 4 ranks.

587. In small organs, the Sesquialtera is not uncommonly made to "draw in halves;" the treble of which is then often labelled "Cornet."

588. The name is, in German organs, further applied to a small Pedal Reed-stop, of 4 and 2 feet. (See Foreign Specifications, Nos. 4, 6, 7, 10, 50, &c.)

Reed-stops.

589. *Double Trumpet.* This is a Manual Stop of 16 feet, with pipes either of metal throughout, as at the late St. George's, Doncaster, and at All Saints, Northampton; or having the tubes to the lowest octave of wood, as at Ashton-under-line. Sometimes the pipes of the lowest octave are omitted; in which case the Stop is frequently called "Tenoroon Trumpet." Its tone is weaker—

though only slightly so—than the Unison Trumpet, to which it of course sounds the octave below.

590. *Double Bassoon. Contra Fagotto.* Also a Manual 16-feet Reed-stop, but of smaller scale and softer tone than the Double Trumpet. A fine specimen occurs in the Swell at All Saints, Northampton.

591. *Double Hautboy.* Another 16-feet Manual Reed-stop, of small scale. An example occurs in the Swell of the organ in Cranbrook Church, Kent, built by Willis.

592. *Trumpet.* An 8-feet Reed-stop, both on the Manual and the Pedal. Its tone is clear and penetrating, somewhat resembling that of the well-known wind instrument after which it is named. The tubes of the Trumpet-pipes are usually made either of tin or metal, though occasionally they are of zinc or wood.

593. *Horn.* An 8-feet Manual Reed-stop, formed of tin or metal pipes of much larger scale than those of the Trumpet. The tone of the Horn-stop is fuller and smoother than that of the Trumpet, and without the clang peculiar and necessary to that Stop. The Horn-stop was invented by Byfield, who was by far the best Reed-voicer of his time.

594. *Cornopean.* Also a Manual Reed-stop of 8 feet, consisting of a set of tin or metal pipes of nearly the same scale as the Horn, but of a different style of voicing. Its tone is more sonorous than the Trumpet; and smoother, though scarcely so powerful, as that of the Horn.

595. *Trombone. Posaun.* A very powerful and full-toned Reed-stop, of 8 feet on the Manual, and 16 or 32 feet on the Pedal. Its pipes are made to a very large scale, and of tin, metal, or wood;—of tin or metal for the Manual; and of metal, zinc, or wood, mostly, for the Pedal.

596. There are 32-feet *Contra* Posauns in churches at Hamburgh and Copenhagen, and of tin. Those at Birmingham and York are of wood. A 16-feet Pedal Posaun of metal occurs in the organ at Exeter Hall, built by Mr. Walker; and one of zinc at the New Church, Cheetham Hill, near Manchester, built by Mr. Hill. Wooden ones are of common occurrence throughout the country.

597. *Ophicleide. Tuba Mirabilis.* The most powerful 8-feet Manual Reed-stop known. The majestic effect produced by this Stop arises partly from its scale, but more particularly from the great strength of the wind that gives it utterance—three or four times that of the ordinary organ-wind. The Stop is usually placed on a sound-board of its own, with a separate bellows, &c. &c.

598. The Ophicleide was first introduced by Mr. Hill into the large organ in the Birmingham Town Hall.

599. *Hautboy.* An 8-feet Manual-stop, formed of metal pipes. The tone of this Stop is thin, penetrating, and of wailing character, like that of the instrument of the same name, the sound of which it of course is intended to imitate.

600. *Bassoon. Fagotto.* This is a soft and slightly nasal-toned Reed-stop, of 8 feet on the Manual, and 16 on the Pedal. Its tubes are made either of metal or of wood. In old organs, the Bassoon is generally a Whole-stop, as at Christ Church, Spitalfields; St. Michael's, Cornhill; &c. In modern instruments, it is more frequently an Incomplete one, sometimes consisting of a single octave of pipes only, acting on the Great octave of Manual Keys, and therefore, as an imitative stop, comparatively useless.

601. *Clarionet, Cormorne, Cromorne,* or *Krumm-horn, Cremona, Corno di Bassetto.* This is another agreeable Reed-stop, of soft intonation, of 8-feet size of tone. It possesses great sweetness and beauty of tone; and, when finished by the hand of a master, is a close imitation of the orchestral Clarionet, invented at the commencement of the last century, by Denner, of Nuremburg, This Stop is met with under a great variety of names. The word Cormorne, from which Cromorne is derived, signifies a soft-toned Horn. The name Krumm-horn is compounded of the adjective krumm, i. e. crooked, and Horn; and signifies a Cornet or small Shawm of irregular form. These names have, in England, been corrupted into "Cremona;" and as the Stop has, in the majority of modern examples, also been reduced from its former full manual compass to one of *fiddle* g range, the idea is thus in two ways conveyed, that it is a *Violin* stop; whereas the last-mentioned (*Geigen Principal*) is a Flue and not a Reed-stop, as already explained*. As the Stop in question is estimated in proportion as its tone approximates that of a Clarionet, and as all organ-builders alike strive to make it imitate that instrument, "Clarionet" is obviously a better name to apply to it than "Cremona;" that is, when it is of Clarionet compass, namely, to tenor c sharp, or to c natural.

602. A Clarionet of deeper pitch, i. e. descending to F F, composed of a longer tube, bent towards the middle, and forming an obtuse angle, is known in England as the *Corno di Bassetto,* and in Germany as the *Krumm-horn* (crooked horn). The appropriateness of this name for a Clarionet-stop of similarly extended compass is therefore obvious. A *Bass* Clarionet, having a compass down to C C, or even B B flat, has recently been introduced.

603. *Corno-flute.* The name given to a Manual Reed-stop of 8 feet, having wooden tubes, and producing a soft and agreeable quality of tone. As it is a Reed-stop, it is not easy to say why it is named as belonging to the Flute-work.

604. *Vox Humana.* This Stop is intended to represent the human voice, which it often does, but very faintly. It is of 8-feet tone, and generally extends throughout the entire compass of the Choir or Swell Organ. Its tubes are very short, like those of the Clarionet, but broader.

605. *Clarion.* A 4-feet Reed-stop, both on the Manual and Pedal, formed of pipes of tin or metal. The tone of this Stop is sharp and clear, giving great brilliance to the Full Organ. The upper octave of this Stop is, on the Manual, generally composed of Open Flue-pipes, because Reed-pipes above f^3 in alt seldom remain long in tune. The Clarion at Doncaster, however, by Byfield, was carried up to the top in Reed-pipes.

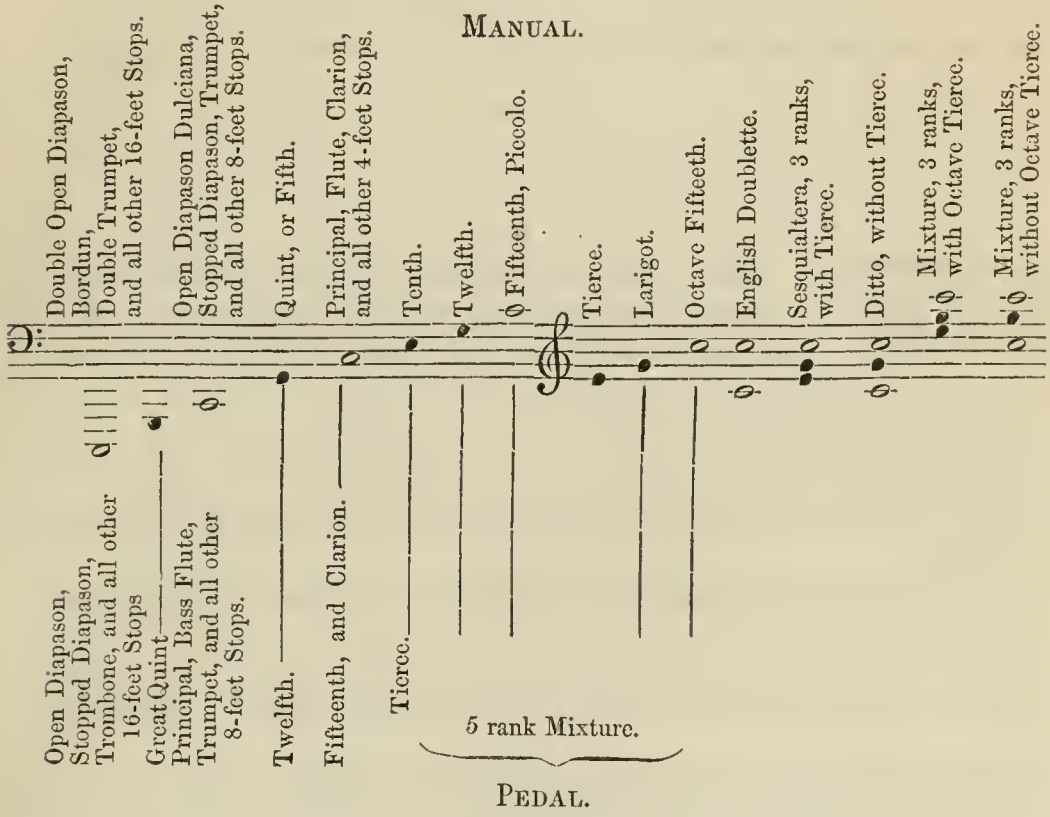
606. *Octave Hautboy. Hautboy Clarion.* This is a 4-feet Reed-stop, composed of pipes of the Hautboy species. It is not a common Stop; but one of the kind occurs in the Swell of the Organ at St. George's Church, Hanover Square.

607. *Octave Clarion.* This is the smallest Reed-stop used in an organ. It is a 2-feet Stop, both on the Manual and Pedal. When it occurs as a Manual-stop, it

* The "names and descriptions of several instruments instruct us as to the nature and design of many Stops in the organ, and what they are intended to imitate. To instance, in the Krumm-horn; the tone of it originally resembled that of a small Cornet, though many organ-makers have corrupted the word into Cremona, supposing it to be an imitation of the Cremona Violin."—Hawkins's History of Music, vol. ii, page 245, note.

usually extends through $2\frac{1}{2}$ octaves in Reed-pipes, C C to f^1 above middle c^1 (sounding from middle c^1 to f^3 in alt), and then carried hence to the top in Flue-pipes. Sometimes, however, it consists of Reed-pipes throughout; breaking first into a Clarion, then into a Trumpet.

Table of the Sounds produced by the several leading Manual and Pedal Stops, from the low C key.

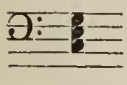
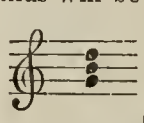
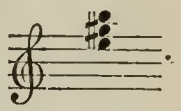


The sound of the 32-feet C is an octave below the first note above written.

CHAPTER XXIII.

THE ORIGIN AND NECESSITY OF FOUNDATION, MUTATION, AND COMPOUND STOPS.

The introduction of Stops of various sizes, founded on a phenomenon in nature.

608. THE preceding Chapter presents a list of all the different organ Stops ordinarily found in English organs, with their sizes and other particulars annexed. The lengths of these are not only very diversified, as will already have been perceived; but the sound of some might, at first, be imagined to be so opposed to that of others, as to be quite irreconcilable with them for any musical purpose. For example, if the 3-part chord of c  be struck, with the Open Diapason drawn, the true sounds will be heard; but if the Twelfth be substituted, the chord of g^1 major  will be sounded; or, if the Tierce be drawn, then the chord of e^2 major  . So that, in fact, we find the following apparently opposed sounds; namely, c, e, g—g^1, b^1, d^2—e^2, g^2 sharp, b^2—concentrated on the same three keys.

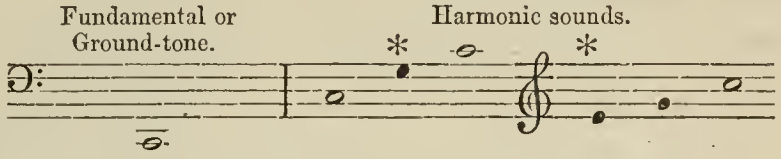
609. Some organs have no separate Tierce wherewith the last example can be illustrated; in which case, some Compound-stop, containing a Tierce, may be drawn for the purpose, by which substitution the dissonance will appear to be still more egregious.

610. Now, it would seem that no agreeable effect could possibly be obtained from the union of sounds so hostile; but so far from this being the case, not only are most of these sounds capable of the most satisfactory reconciliation, but their presence is positively indispensable to the production of true organ-tone. The fact of their sounding so disagreeably, when tried as above suggested, arises from the peculiar manner of using them, which is *not* in accordance with the generally received method. The object, however, was simply to show that such combinations of sounds exist in organs: it has now to be explained *how* it is they are found there, and *why* it is they sound so well there, when well balanced and properly tuned.

611. If, when all is perfectly still, one of the bass strings of a pianoforte, or the fourth string of a violoncello, be set in vibration, other and higher sounds will be heard to accompany the fundamental sound or *ground-tone*.

612. A deep-toned string is best to select, in order to obtain a favorable illustration of this experiment; because the higher the fundamental sound is, the quicker

will the harmonics follow each other, and consequently the less audible will they be —particularly the higher ones.

613. These concomitant sounds are what are called the harmonic sounds; and they stand, in relation to the principal or ground-tone, in the following ratios:

Some of the smaller harmonics, as being of no importance here, are not noted down.

614. On examining the above notation, representing the series of harmonic sounds, it will be discovered that the sounds which at first appeared to be so much out of place (distinguished above by asterisks) correspond exactly with two of those suggested by nature. In fact, they, and indeed the sounds of all the smaller Foundation, Mutation, and Compound Stops, are introduced to *corroborate* Nature's dictates, and to reduce into the form of *primary* sounds what she indicates in the shape of *harmonic* sounds.

615. Nor are these Harmonic-corroborating Stops voiced so as to sound as weakly as the harmonic sounds themselves; yet they blend so well with the other Stops in all good organs, that together they produce the effect but of one full, brilliant, and magnificent whole.

616. This unity of effect, and due subordination of the Mutation-stops, are secured partly by the greater number and power of the Foundation-stops; partly by the weaker intonation of the Mutation ranks; partly by the restricted and correct method of using them; and partly by their being of the proper relative lengths.

How the sizes of the Harmonic-corroborating are deduced and fixed.

617. We have now to ascertain what those rightly decreasing lengths are, and to what Stops those lengths direct us, as being necessary to represent the harmonic series of sounds. The former point may be the most easily illustrated by a reference to the measurement of a string, and the extent to which its vibrating portion must be successively lessened, to reduce those harmonic sounds into a series of natural sounds.

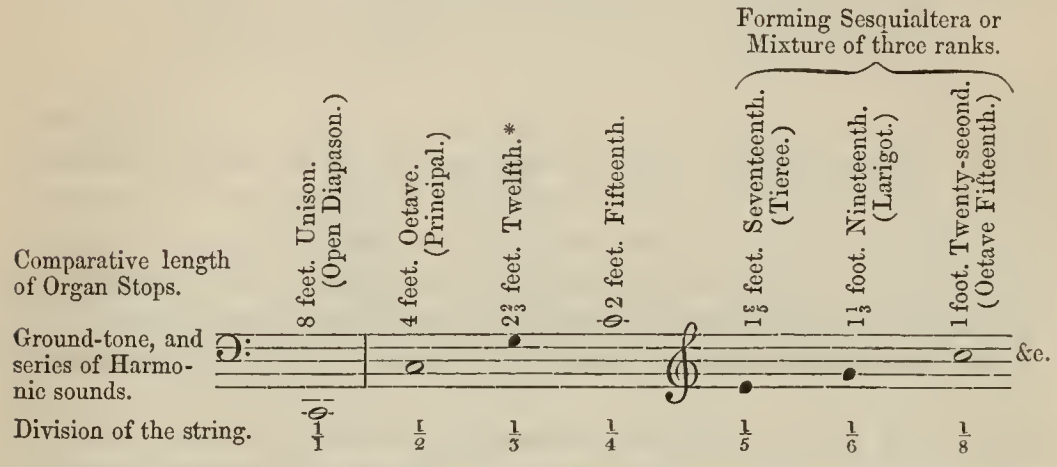
618. A string of a certain length, thickness, and tension, will produce a given sound. To make that string produce the *octave* of its full-length sound (corroborating the first acoustic sound), the vibrating portion must be shortened to *one-half*. To produce the fifth of that octave, or the *twelfth* of the original sound (the second acoustic sound), it must be reduced to one-third; to one-fourth, to obtain the second octave of the full-length sound; to one-fifth, to produce the seventeenth; to one-sixth, for the nineteenth; and to one-eighth of the original length to produce the twenty-second, or third octave of the original sound.

619. According to this scale, the fixed length of the harmonic series of Stops should be $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, and $\frac{1}{8}$ the length of the Chief Foundation or Ground-stop, whatever that may be. That is to say, if an 8-feet manual Open Diapason be taken as the basis of the organ-tone, the smaller stops should measure in length 4 feet ($\frac{1}{2}$), $2\frac{2}{3}$ feet ($\frac{1}{3}$), 2 feet ($\frac{1}{4}$), $1\frac{3}{5}$ foot ($\frac{1}{5}$), $1\frac{1}{3}$ foot ($\frac{1}{6}$), and 1 foot ($\frac{1}{8}$).

620. Or if a 16-feet Stop be taken for the foundation, as would be the case for

the Pedal, the length of the harmonic series would be 8 feet ($\frac{1}{2}$), $5\frac{1}{3}$ feet ($\frac{1}{3}$), 4 feet ($\frac{1}{4}$), $3\frac{1}{5}$ feet ($\frac{1}{5}$), $2\frac{2}{3}$ feet ($\frac{1}{6}$), and 2 feet ($\frac{1}{8}$).

621. And such we find to be the case; for, on comparing the first of the above codes of "lengths" with those given in the list of Stops in the last chapter, they are found to single out the identical Stops from the great number which are so constantly found in all organs. This fact is still more clearly illustrated in the following example:



622. In the above table, the notes represent the harmonic series of sounds, the figures beneath show the extent to which a string must be shortened to produce those sounds, the figures above show the precisely corresponding reduction that is made to transfer the series from a string to columns of air within pipes; and the names over all are those of the organ Stops to which the lengths have directed us.

Reasons for marking the length of the Stops on the knobs.

623. We are thus made sensible of the advantage and importance of having the *length* of the Stops placed on all the draw-stop knobs, *in addition* to the *names* of the Stops. Their names are *variable*, and may be *familiar*, or *not;* but their lengths, or size of tone, are *fixed*, and therefore give an unerring clue to their *pitch*, when the names may perhaps be wholly unintelligible. It is now also obvious why the Fifth-sounding Stops should not be marked as being of "6 feet" and "3 feet," those figures placing the length of those Stops beyond their deducible admeasurement.

Theoretical exceptions sometimes taken to certain organ-stops.

624. It should not be omitted to be noticed, that some theorists take exception to some of the Harmonic-corroborating Stops—some objecting to the Tierce, because of its sounding the *major* third to the key struck, which it is thought must be offensive in a *minor* key; others, to the Twelfth, on the ground that it causes all musical progressional passages to be played in *consecutive fifths;* and others, again, to the Double Diapason downwards, and the Principal and smaller Foundation-ranks upwards, as they play in *consecutive octaves* to the Diapasons. According to the laws of musical composition, all such progressions, in strict writing, are forbidden, and all the above objections are equally strong and entitled to attention.

625. The rules of musical composition, however, are scarcely the tests by which the admissibility of organ Stops can be truly judged. An organ never sounds so well as when it contains most of these "theoretically" objectionable Stops. This fact may be

soon evidenced on an organ that contains them; though it will be necessary to proceed inversely. It may be ascertained thus: first draw all the open Flue-work; if the Twelfth, the "consecutive fifth" Stop, be shut in, there is then nothing to break the bare octave-work from the Diapason, till you come to the Mutation-ranks of the Compound-stops, and the tone consequently loses some of its roundness—becomes top and bottom. Close the Mutation-ranks of the Compound-stops, and the tone becomes more thin and cutting, because the sounds designed to fill up some of the intervals between the Foundation-ranks, to bind the whole together, are silenced. Next shut in all the "consecutive octave" Stops upwards, and the tone will be deprived of all brightness; and lastly, put in the Double Diapason—the Stop which sounds in unison with the adult male voices in the melody of a Corale,—and the Manual will lose its greatest gravity. Nothing but the Open Diapason will be left; the organ will be theorised down from a magnificent instrument to certainly a solemn, but, at the same time, dull and monotonous single set of pipes.

626. The laws of musical *progression*, and the phenomenon of harmonic *attendant* sounds, are, in reality, two very distinct subjects. As an illustration of this, it is only necessary to play on a full organ, with the Mutation and Compound-stops drawn, first a series of single notes, and then the same succession in fifths, when the difference between harmonic *attendant* sounds, and harmonic *progressional* sounds, must at once become apparent.

CHAPTER XXIV.

PARTICULARS CONCERNING THE SCALE AND THE BALANCING OF ORGAN STOPS.

The comparative scale of the foundation and mutation stops, and ranks of pipes.

627. It was stated in the preceding chapter that the sounds of all the Mutation-stops and ranks of pipes are kept in a certain degree of subordination; and various means were mentioned by which this end is attained. In German organs, where the 8 and 4 feet Flue-Stops are generally more numerous than in English instruments, to their great improvement, and where Double Stops are such common as well as excellent features, the Mutation-stops are made to as large a scale as the Foundation; the predominance of the latter being secured by their greater number. Great breadth, as well as fulness of tone, is obtained by these means.

628. The old English builders made very little variation in the scale of the different Stops, but kept to nearly the same measure through them all. This accounts for the remarkably full as well as brilliant tone of the *chorus-work* of the best of their organs. This ringing, cheerful quality, however, is by no means a general, or even common, characteristic of old organs. In some cases, the scale of the small pipes was either too large—according to modern views,—or the pipes were not sufficiently blown; consequently, the tone of the small Stops and Mixtures became thick, or, as it is technically called, "horny." On the other hand, when the scales run too small, the tone indeed becomes bright, but without sufficient fulness; "sharp," as the Germans have it.

629. Father Smith made his Principal, Twelfth, and Fifteenth *one* pipe smaller than his Open Diapason; and the several ranks of his Mixtures *two* pipes smaller; so that the Twelfth was of the same scale as the Fifteenth, and the Tierce as large as the octave Fifteenth. By the requisite voicing, the tone of the Mutation-stops and ranks was rendered smooth and mellow, and that of the Foundation-ranks full and bold; the effect of the whole being exceedingly firm and clear, although occasionally lacking sufficient body, firmness and depth of tone, consequent on the smallness of the number of Unison and Octave Stops, and the entire absence of Double Manual Stops. As this circumstance involves a matter of some moment, where the renovation and enlargement of an old organ is concerned, it may be briefly discussed here.

630. Much pains was taken by the writer, while abroad, to test several Continental organs, with precisely the same Stops drawn that are usually found in old English organs, and the experiments were invariably attended with the same effect as that witnessed from some of the best old instruments of this country, namely, the production of a clear and ringing character of sound, but accompanied by an overamount of Mixture-tone. It was also observed that, on adding the *remaining* Stops,

the accurate balance of tone was immediately restored. An indisputable proof was in this manner obtained of the *cause* of the misproportion originally existing in so many English organs; as well as a clear illustration of the most correct way of *remedying* that defect. The "fathers of modern organ-building in England," Harris and Smith, studied their art *abroad*, where it was the custom to produce a fine and well-balanced organ by disposing a certain proportion of Mixture-work to secure clearness, boldness, and vivacity; one or more Double Stops to impart gravity and dignity; and a good number of 8 and 4 feet Stops to give *firmness* and definitiveness to the whole by blending the various elements in harmonious amalgamation. On arriving in this country, they encountered a serious difficulty in being compelled to keep their organs within restricted dimensions. Perhaps they were also sometimes straitened in the matter of terms; and they might even have had to contend with a want of appreciation and co-operation on the part of contemporary organists.

631. Being denied the necessary room wherein to complete their Manual organs —even independently of a separate Pedal organ, which was invariably omitted—they had to relinquish some of those Stops which would require the *most space* for their accommodation; hence, the Double Stops were generally expunged, and, in some cases, even some of the Unison and Octave Stops also.

632. The due proportion of the three great elements being thus disturbed, by the entire omission of one, and the weakening of a second, the third then naturally stood out with undue prominence. To give an instance: Dr. Burney, in his History of Music, vol. iii, page 440, note, speaking of the St. Paul's Cathedral organ, says, "notwithstanding the power of the chorus of this admirable instrument, several more excellent Stops were made for it, which lay many years useless in the vestry, but for which Sir Christopher Wren, tender of his architectural proportions, would never consent to let the case be sufficiently capacious to receive." In the English Musical Gazette, for January, 1819, page 6, it is stated what some of those Stops were. After mentioning that Sir Christopher Wren "would not consent to let the case be enlarged to receive them," the narrator proceeds to say, "three of the Stops were in consequence obliged to be kept out; viz. a Bassoon, a Clarion, and another Stop of minor consequence, which were kept in the Cathedral for several years after—Schmidt hoping he might get them in at some future period; but he died a few years before Sir Christopher Wren." The Stop of "minor consequence," as it seems then to have been considered, Mr. Bishop imagines to have been a *Double Diapason;* and Mr. Sutton, in his "Short Account of Organs," page 34, adds, "this conjecture seems highly probable, as there is no doubt that, to contain a Double Diapason in addition, the organ-case would necessarily have to be much enlarged."

633. Again, in the building of the Temple organ, Smith had to confine his work within certain limited dimensions, in order that, if his instrument should be accepted, it might go within the western arch of the choir; hence it was not only made without Doubles, but with one Open Diapason only to support 6 ranks of Mixture in the Bass, and 9 in the Treble; and the Great and Choir organs had to be crowded on to one Sound-board.

634. At St. Paul's, in consequence of the omission of all Double Stops, one Unison, and one Octave Stop, what then remained as "the organ" was of course thrown out of proportion; and "the power of the chorus," noticed by Dr. Burney,

becoming thus excessive, the Mixtures were ultimately taken out, and new ones of softer tone introduced. The influence of "large" and "small" Stops on the general effect of an organ, is a subject concerning which nearly as much misapprehension prevails in England now as in the days of Smith and Harris. Many imagine that, because the introduction of a few Double, 8 and 4 feet Stops will increase the "bulk" of an organ by perhaps one-half, therefore their striking and arresting effect must be in proportion; and that, as the addition of more Mixture would not call for the addition of six inches to the depth of the organ, its introduction would exercise as little appreciable difference to the ear as it would to the eye. These are the *popular* ideas on the subject; whereas, the facts are exactly the contrary. The large Stops increase the fulness, roundness, depth, and sonority of the organ, imparting great richness to the general effect; whereas, more Mixture may increase the "din" of the organ to such an extent as to be almost intolerable. Dr. Burney appears to have been, to some extent, under the influence of the general misapprehension; for, in the extract already given—"*notwithstanding* the power of the chorus, *more* excellent Stops were made," &c.—he writes as though the effect of the omitted Stops would have been to *increase* that "power;" whereas they would certainly have tended to *subdue* it. Sir Henry Dryden, in his pamphlet on "Church Music," when writing concerning *modern* Church organs (pages 28 and 29), says, "Generally the Pedal organs are too weak, the Great organs too noisy, the Choir organs too small, and the Swell organs too short in compass. We have a great deal too many Mixtures and such-like cheap Stops, and too few of large and expensive open metal Pipes. It is difficult to have too much Bass to an organ. No sound below a voice will drown it. The Pedal pipes at Westminster Abbey will not drown the weakest boy's voice. Mixtures and Sesquialteras drown voices." It is manifest from this, how permanently injurious it must be to limit the space for an organ to such an extent that the organ-builder cannot introduce all the Stops necessary to produce a well-balanced instrument.

635. The Stops that have a tendency, from their brightness, to interfere with the just predominance of the voices, always find ready admission; while those that are necessary for sustaining and supporting the voices are almost as invariably limited in number and efficiency.

636. The Mixtures in Father Smith's organs were, from the causes already explained, so uniformly made to appear "too shrill," or "too screaming," that, in the great majority of instances, they have since been melted down and replaced by others of weaker intonation. Many of Harris's organs, also, have been brought into proportion by a like process. Another way of obtaining this end would have been to *add* Stops similar in pitch to those which the original builders had, from the good influence of early education, learnt to consider as necessary, and which the experience of more recent times has proved to be indispensable, but which they were, from the first, compelled to relinquish, and to the omission of which the original misproportion was to be ascribed. This would not only have *restored* the balance of tone, but would have *raised* those instruments towards the state of completeness and efficiency contemplated by their respective makers, and upon an acoustic principle with which they were perfectly familiar; for it is important to bear in mind that most of the large organs constructed in England during the last ten years, with Double Manual

Stops and an independent Pedal organ, are, in reality, only on an equality in these respects with many of the instruments which Smith and Harris left behind them in their native countries upwards of a century and a half ago, and with some of which they could not fail to have been well acquainted.

637. Organs having Double Stops on the Manual, and a 16-feet Pedal, were of most common occurrence in France, Holland, and Germany, not only in the seventeenth century, but even in the *sixteenth*. For instance, those at Freiburg in Breisgau, built in 1520, containing 24 Stops (see Foreign Specifications, No. 37); at Amsterdam, *enlarged* in 1673, 44 Stops (Specifications, No. 5); at Rouen, 1630, 49 Stops (Specifications, No. 17); at Amiens Cathedral, built as long ago as 1429, and yet with a 16-feet front (Specifications, No. 14); and at Antwerp, 1645 and 1670 (Specifications, Nos. 21 and 22); all those just mentioned, among a number of others, included the above-mentioned features among their original constituent parts; the Pedal organs comprising from 4 to 10 Stops—a proportion that is considered liberal even in the nineteenth century in England.

638. There were even some 32-feet organs also existing in Germany as far back as the sixteenth century. At St. Mary's Church, Lübeck, an organ was erected *previous* to the year 1561, with a 32-feet front of polished tin; and at St. Peter's Church, Hamburgh (since destroyed), was a 32-feet organ of still earlier date, it having been erected before the year 1548. The several foregoing facts and dates are important, and necessary to be introduced here, as being calculated to allay the groundless fear occasionally expressed, that the present race of English organ-builders are getting their instruments "too large;" whereas in reality they are only introducing certain Stops requiring much space, that are necessary to produce a full and well-balanced tone. The organs of Harris and Smith were originally little more than "8-feet organs," destitute of Pedal; the "Great organ" departments being, in most cases, scarcely so complete as the "Echo" or "Choir" of many old Continental organs, as may be ascertained by comparing the original Specifications of their instruments with those of the last-named parts of foreign organs, described at the end of this work. Modern builders, in striving to raise the standard of English organs above that to which the excellent makers just named were permitted by circumstances to work, are really doing no more than placing their instruments, in regard to number and distribution of Stops, *on a par* with those made nearly *two centuries since* abroad,—of course introducing such beneficial alterations into the list of Stops as modern science has placed at command, and also incorporating numerous improvements in the mechanism that were not even so much as dreamt of at the former period;—and it seems needless to treat this attempt to place the nineteenth century English organ at least on an equality with the seventeenth century foreign organ, as an alarming advance, or as a hazardous enlargement.

639. As bearing upon the subject of the great improvement to be effected by the judicious development of a really good old organ, an extract may be made from Mr. Edward Holmes's entertaining volume, entitled, "A Ramble among the Musicians of Germany," in which the author, after mentioning Silbermann, "one of the most renowned builders of Germany, and whose name (Silvermann) very well describes the quality of his tone," proceeds to say, in a foot note, page 193: "As a matter of science, it is worthy consideration how far the structure of our organs might be improved by

uniting the sweet *cathedral* quality of tone, for which those of the Temple, Westminster Abbey, &c. are noted, with the magnificence of Silbermann." Had Harris and Smith worked unfettered, there is little doubt but the two attributes above specified would always have been found combined in as eminent a degree in their organs as in those of the great Strasburg builder. In the absence, however, of this, and in proceeding to renovate organs of their make, the choice lies between "wedging up," "papering up," or "melting down" the original Mixtures, supplying their place by others of softer tone, and of *reducing* their comparative strength of tone by *increasing* that of the 8 and 4 feet tone, by adding to the number of Stops producing those pitches, and by also engrafting one or more Double Stops. The former course has the charm of economy to recommend it, although it involves a greater departure than ever from the calculation of the original builder; while the latter and more expensive process effects a nearer approach to it.

640. In some of the organs built soon after Smith and Harris's time, a better balance of Manual-tone was attempted, by giving the small Stops less wind at the foot; but the former large scale being at the same time also retained, the result was the production of an indistinct, dull, horny quality of tone, as already mentioned.

641. The organs of John Schreider, Smith's son-in-law, are distinguished from those of Smith, by having the Diapasons voiced stronger in the treble. The extent to which his organs were susceptible of improvement by the introduction of Double Stops, &c. has been satisfactorily evidenced in the enlargement of his fine instrument in Westminster Abbey, the additions to which were made by Hill.

642. Renatus Harris's organ at St. Sepulchre's, Snow Hill, has also been considerably improved, by additions made by Gray and Davison, and would, by the introduction of Double Manual Stops to the Great organ, be rendered quite magnificent.

643. The younger Harris (John) made the Tierce in his organs of the same scale as the Principal, Twelfth, and Fifteenth; i. e. one pipe smaller than the Diapason; and the Mixtures two pipes smaller.

644. In conjunction with his partner Byfield, he increased the strength of the 8 and 4 feet sound, by the more frequent introduction of a second Open Diapason, and of a Trumpet and Clarion of great power and beauty of tone. In the organ at St. George's, Doncaster, erected in 1738, those builders introduced *two* Trumpets. The Mixtures of Harris and Byfield were usually carried up higher in the musical scale without a break, than were those of Smith; hence a greater amount of brilliance, though with scarcely so much boldness, from the omission of the duplicate ranks for which the higher ones were substituted. It may be mentioned, that the firmness is imparted by the number or strength of tone of the 8 and 4 feet Stops; while the boldness, brilliance, or keenness, depends a great deal on the composition, scale, and winding of the Mixtures. The younger Harris's Compound-stops were wonderfully animated and ringing, which properties seemed to indicate that their maker included Double Manual Stops in his conception of what a complete organ should be; and this opinion was afterwards confirmed at Doncaster, when such Stops were added, by the increased beauty which they imparted to the tone of that originally fine organ. The organ built, in 1740, by the same Byfield, in conjunction with his *other* partners, Jordan and Bridge, for the church at Great Yarmouth, actually had, according to Dr. Burney's account, printed in Rees's Cyclopædia, under the article "Organ," a

Double Diapason; also two Open Diapasons, two Trumpets and Clarion, and 9 ranks of Mixture.

645. Both Schwarbrook and Snetzler (Germans) also succeeded in incorporating a Bordun as a part of their organs at St. Michael's, Coventry, 1733; and Lynn Regis, 1754. In reference to that in the last-named organ, Dr. Burney (History, vol. iii, page 438, note) says, "One of the metal Stops of this instrument, called the *Bordun*, is an octave below the Open Diapason, and has the effect of a double bass in the chorus." The Double Stops have since disappeared from the Yarmouth and Lynn organs; and as Stops of that nature were but very rarely introduced into other instruments, these circumstances clearly indicate that even at so recent a period as a century since, the prevailing taste, or prejudice, or both, of English organists continued to run counter to the attempted advances of the most eminent builders towards the production of a complete and well-balanced organ. It would be interesting to ascertain, if it were possible to do so, whether the trifling and irreverant notions concerning organ-playing in church, so much in vogue throughout the last century, were so at the time of Smith and Harris's arrival in this country; and, consequently, whether the incapacity to appreciate, and therefore to advocate, the broad and dignified instruments which those builders were prepared to construct, was to be attributed to the then prevailing musical taste; or, whether the frivolous and tasteless manner in question of using the organ was the *consequence* of their usually being composed chiefly of "little" Stops, as some of the Germans have expressed themselves, somewhat contemptuously, when speaking of our old organs. One thing is at any rate certain, that the organs were not calculated to *encourage* the conception of elevated musical ideas; nor, if they arose, independently of external assistance, were they capable of *realising* them*; hence the production of so much music, specially written for such instruments, that now reflects nought but discredit upon the contemporary musical taste of this country. Dr. Crotch, in his "Elements," page 89, felt it necessary, in addition to directing the taste of students, also to state what they should avoid. "Organ voluntaries," he says, "should consist of fugues, with introductions for the full organ, upon the model of Sebastian Bach and Handel. Soft movements for the Diapason and Swell should be slow and sweet, or mournful and pathetic, and may be in the Italian style of the seventeenth century. *English voluntaries* for the Trumpet, Echo, Vox Humana, Cornet, Oboe, and other solo Stops, are too often vulgar, trifling, and ridiculous; being equally void of science, taste, and that decorous gravity of style which should ever characterize church music." It is an important fact that, in Germany, where Double Manual Stops have been common for centuries, the vicious style of organ music above referred to *never existed*, so far as we are aware; whereas, in England, it never *ceased to exist*, until an appreciation for that class of Stops, and for firmer "medium-work," began to spread itself,—that is, within the present century.

646. George England made his Principal one pipe smaller than his Open Diapason, his Fifteenth two pipes narrower, and every rank of his Mixtures to a varied scale.

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* Those who, like the writer, heard Mendelssohn extemporise, in 4 or 5 pure parts, on an essentially *English* organ, will remember how destitute of breadth and dignity was the effect which emanated from what present organ-builders call the "thin-toned old organ."

647. In a Compound-stop of 4 ranks, comprising 17th, 19th, 22nd, and 26th, he would make the 17th a small scale, the 19th rather larger, the 22nd large scale and powerfully voiced, and the 26th small again, and voiced almost as a Dulciana. This last rank, nevertheless, made itself heard, and gave to the Mixture a sound as of bells. England's Mixtures were of a very silvery and sparkling quality; though not so bold as Smith's, nor so full as Harris's, on account of their different composition and smaller scale. His larger organs commonly had the advantage of four 8-feet Stops and three 4-feet Stops, which, in conjunction with the lighter Mixtures, presented a two-fold modification greatly in favor of a well-balanced tone; though, from the greater comparative firmness thus imparted to the medium-work, they are generally quite capable of "carrying" a 16-feet Stop of light intonation.

648. Green's scales were, in some respects, larger than those of any of the preceding; that is to say, he made his 17th and 19th *one* scale smaller only than the Diapason, and the 22nd alone *two* scales less. The Open Diapason itself was made one pipe smaller, in the treble, than Father Smith's scale, but several pipes larger in the bass; and was generally of remarkable excellence, the treble part being very pure in quality, though not very loud, and the bass full and ponderous. His Mixtures varied but slightly in their composition from those of Smith; while in the voicing, Green's pipes were closely and finely nicked, and not cut up much, and with comparatively but little wind passing in at the foot; hence his soft, rich, and pleasant tone, which, however, generally lacked the boldness and energy of the organs of Harris and Smith.

649. The system of scaling frequently followed in modern times is as follows. To speak first of the Foundation-stops: the Open Diapason is made to the largest scale, because, being the *chief* Foundation-stop, it is essential that its sound should predominate. The Principal is made one scale smaller than the Open Diapason; the Fifteenth one scale less than the Principal—and so on, each successive Foundation-rank rather smaller than its predecessor. Thus the 2-feet pipe of the Principal, speaking on the Tenor c key, is made of the same diameter as Middle c^1 *sharp* pipe of the Open Diapason; and the 2-feet pipe of the Fifteenth speaking on the CC key, the same width as the Middle d^1 pipe of the Open Diapason.

650. Each Foundation-stop, however, commencing from the Open Diapason upwards, is voiced rather brighter, as may be ascertained by first drawing the Open Diapason and striking the Middle c^1 key, when a full and sonorous sound will be heard. Change the Open Diapason for the Principal, and press down the Tenor c key; the sound, identical with the first one in pitch, will be rather louder, but less full. Substitute the Fifteenth for the Principal, and strike the CC key, which will reiterate the same pitch, and the sound will be yet brighter, though there will be less again of it.

651. The Twelfth is much varied in scale, according to circumstances. If there be but few ranks of Mixture, the Twelfth is made only of the same diameter as the Fifteenth, although its pitch is a fourth lower, and its pipes consequently more than one-fourth longer. At other times, it is made of the same scale as the Fifteenth.

652. The Third-sounding Stops are made to a still smaller scale, as their sound has to be more subdued even than that of the Fifth-sounding Stops.

653. The Foundation-stops, then, are the largest scaled and the loudest; the

Fifth-sounding Stops the next; and the Third-sounding the smallest of all in much modern work.

654. Towards the commencement of the present century, the usual method of balancing the Stops was much disturbed by the influence of certain theoretical organists of the time, who would have the Compound-stops voiced so as to sound nearly as weakly as the acoustic sounds they were introduced to corroborate. At the present time, those organ-builders enjoy the highest reputation in England whose instruments are voiced the most directly *at variance* with these theoretical notions.

655. Organ builders are frequently heard to speak of an Open Diapason being made to a 12, 13, 14, or 15 inch scale, as the case may be. These figures refer to the width of the sheet of metal out of which the gamut G pipe is made, and which pipe therefore, when finished, ordinarily measures from nearly 4 to about 5 inches in diameter.

656. According to the scale of the Open Diapason, those of the Harmonic series of Stops are of course regulated.

The increase of scale in a stop as the pipes become shorter; and why necessary.

657. It was shown in Chap. XIX, ante, pp. 101, 102, & 103, that a pipe which sounds the octave above another of the same kind is only half the length of the first one. Thus, in a Manual Open Diapason, the C C pipe of which is 8-feet in length, the Tenor c is but 4-feet; the Middle c^1, 2-feet; the Treble c^2, 1-foot; and the c^3 in alt, 6-inches. The *diameter* of these several pipes might, at first thought, be imagined to decrease in proportion to the reduction in their *length*. This, however, is not really the case. As the pipes gradually become shorter, they are made *rather wider* in proportion. As an illustration of this, suppose the 8-feet pipe of an Open Diapason to be 6 inches in diameter; the 4-feet pipe will not be simply 3 inches, but about $3\frac{1}{2}$ inches in width; the 2-feet, not $1\frac{1}{2}$, but $1\frac{5}{16}$ inch in diameter; the 1-foot, not $\frac{3}{4}$ of an inch, but $1\frac{1}{4}$; and the 6-inch pipe, not $\frac{3}{8}$, but $\frac{6}{8}$ of an inch in diameter. Thus we find that the diameter of a metal open pipe, as compared with its length, is, in the course of four octaves, sometimes just doubled.

658. A still greater increase is made upwards in the scale of a Reed-stop. Take, for instance, an 8-feet Posaun. In some examples, the C C pipe, 8-feet, measures 5 inches in diameter; the Tenor c, 4-feet $4\frac{1}{2}$ inches; the Middle c^1, 2-feet $3\frac{1}{2}$ inches; Treble c^2, 1-foot $2\frac{3}{4}$ inches; and the c^3 in alt pipe, 6-inches in length, 2 inches in diameter at the bell.

659. The object for which an increase is made in the scale of organ-pipes, whether of the Flue or the Reed species, is to secure as far as possible an equality and uniformity in the strength and tone-character of the Stop throughout its range, and which could not be otherwise obtained; for the pipes of an Open Diapason would ultimately become smaller than those of a Dulciana, the c^3 in alt pipe of which Stop measures $\frac{7}{16}$ of an inch, good, in diameter; and those of a Posaun, less than those of a Bassoon.

660. It has already been explained, that a performer on a wind instrument has to exercise a *greater* effort of the muscles of the lungs, in order to secure the high sounds being of *the same* strength as the low ones. In like manner an organ-builder first *increases* the scale of his Stop gradually from the longest pipe up to the shortest,

as a preliminary to his obtaining even *the same* amount and kind of tone. He then admits an increased quantity of wind in at the foot, for the purpose of blowing from each successive pipe of the series an undiminished strength of tone—an *additional* amount of wind of the same density producing nearly an equal effect to that which the same amount of wind of greater density would do. In some of the modern French organs, and also in the organ at the Panopticon, built by Mr. Hill, and that in the Town Hall, Glasgow, built by Mr. Davison, the treble portion of the Stops is supplied with a wind half an inch or an inch heavier than the bass part, which brings the method of producing high sounds from organ-stops and from wind instruments into closer analogy.

661. Many of the German builders have for a long series of years obtained a similar result, either by introducing two pipes to each key in the treble, as in Müller's celebrated organ at Haarlem, finished in 1738—see Foreign Specifications, No. 1; and in Batz's organ at Utrecht, erected in 1826—see Specification, No. 10; or by putting larger pipes in the treble of their Compound-stops than is usual in England. The latter plan, which is one of great utility, will be more fully explained in a following chapter.

A variation is made in the scale of the stops of the same name on the different Claviers, and also in the duplicates on the same Clavier. The reason and necessity thereof.

662. The Stops belonging to each separate division of an organ are made to a different scale to what the corresponding stops are on the other departments: that is to say, the Open Diapason in the Swell is made to a somewhat less diameter than the like stop in the Great organ, and that of the Choir organ smaller again, which variation of scale in the fundamental Stop, or "Diapason" of each Clavier, leads, as a matter of course, to a corresponding variation in that of the Harmonic series of Stops of each department.

663. One of the main objects in this variation of scale is, to secure to each department the requisite distinctness of character and proportionate strength of tone. Thus a large scale is adopted for the Great organ, the tone of which is required to be full, broad, and strong: a somewhat smaller scale for the Swell, which combines in its sound much of the dignified character of the Great organ tone, united with the sprightly tone of the Choir: the smallest for the choir organ, the sound of which is lighter than that of the other Manual organs, yet full of life and vivacity: and the largest for the Pedal, which should possess weight, depth, and fulness.

664. The way in which a variation of scale is effected, is, by taking the diameter of, say, the C C sharp pipe of the first stop as the scale for the C C pipe of the second stop, and by following out the same relative and reduced measure throughout the series of pipes.

665. For another scale, the width of the original D D pipe would be taken for the C C pipe.

666. Where two Stops of one kind are placed on the same Manual, as, for instance, two Open Diapasons, or two Principals, the second is usually made to a different scale from the first; and not only so, but to a scale varying, however slightly, from that of the similar Stop on all the other Manuals. One reason for this is, if two Stops are made to the same scale, and voiced alike, they are very likely to "sympathise."

667. When two pipes sympathise, a beating or waving is heard when they are sounded together, although they are perfectly in tune when tried separately, and do not "rob." Sometimes the two pipes together will even sound weaker than either when used separately.

668. Varying the scale is one of the means taken for preventing sympathy; not indeed that this step is *indispensable* to that end, since some organs exist having two Open Diapasons in the treble, of *the same* scale, which do *not* sympathise; while, in other examples, having two Open Diapasons of *different* scale, a tremulousness *does* appear. It is, nevertheless, one of the most advisable as well as most usual methods adopted to prevent it. A "beating" between two pipes made to *different* scales will arise from their being placed too near to each other on the sound-board.

669. In that case, the defect does not arise from "sympathy," but *proximity*. To prevent any waving occurring from this second cause, it is essential that the two Stops should be placed at some distance apart, and, if possible, be separated by other Stops.

670. An additional reason to that given above for making the corresponding Stops of the several Claviers to different scales, is to avoid, as far as possible, any beating occurring when any of, or all, the departments of the organ are coupled together.

671. Again, the repetition ranks in the Compound-stops of a department—i. e. the duplicate ranks which are introduced where the "breaks" occur, and which appear in greater or less abundance in all Mixture-stops, as already explained at page 121, sec. 57, 92, and 573—are generally made to diversified scales in England, with the view to preventing any tremulousness appearing among them.

672. For this reason, also, the duplicates in the Compound stops—that is, the repetition of certain ranks of pipes which always occur in greater or less abundance where there are many ranks of mixture, particularly in the treble part of the stops—are generally made to diversified scales, otherwise a beating or waving is likely to arise from the phenomenon just noticed.

673. Father Smith not only used to vary the scale slightly, but also to make the feet of the duplicate ranks to a different length; so that the pipes might speak on a different level to the others. Green and England also varied the length of their pipe-feet for a similar purpose.

CHAPTER XXV.

THE TEMPERAMENT OF THE ORGAN.

The temperament; the phenomenon in nature that occasions its necessity; and the different systems.

674. THE interval of a perfect octave comprises somewhat less than 6 major tones; more than 3 major thirds; and less than 4 minor thirds. For example — supposing the perfect octave to be divided into 3010 equal parts, the interval of a major tone would contain 511 of those parts, which number being multiplied by 6 would make 3066 instead of 3010, i. e. plus 56 parts. A minor third would be equal to 791 of such parts, which being multiplied by 4 would make 3164 instead of 3010, plus 54 parts. A major third would contain 969 of those parts, which number being multiplied by 3 would only make 2907 instead of 3010, i. e. minus 103 parts. (See Charles Child Spencer's "Treatise on Music." See also Dr. Crotch's Elements of Musical Composition, second edition, page 99, where the author shows, by means of diagrams, illustrating experiments made on the monochord, the extent to which the octave falls short of the true octave when measured by perfect thirds, and how much it exceeds it when measured by major tones.) This excess or short-coming, as the case would be, according to the manner of dividing the octave, is called the *wolf* — a term said to have been originally suggested by the howling effect of a badly tuned consonance.

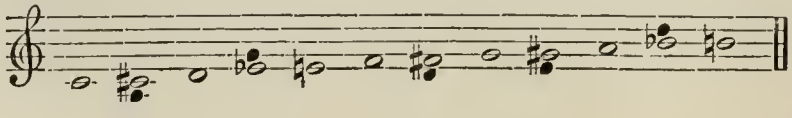
675. In all instruments of which the scale consists of 12 *fixed* sounds in the octave, and in the organ among that number, this imperfection has to be softened down and hidden, as far as possible, by *distribution;* and any interval that is slightly augmented or reduced in receiving its allotted share of the dissonance, is said to be "tempered," while the *principle* on which the dissonance is distributed—whether equally among all the scales, or so as to appear less obviously in some of them and more so in others—constitutes the *system* of temperament adopted.

676. Two distinct systems of temperament suggest themselves—the *equal* and the *unequal;* of which the latter is by far the oldest.

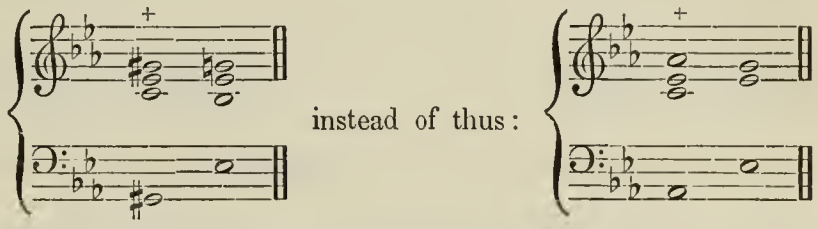
677. Most of the Church music composed previous to the middle of the 17th century was written either in one of the five major scales of C, G, D, F, or B flat; in one of the three minor scales, A, D, or G; or in some one of the ancient scales, commencing on one of the notes just named.

Unequal temperament.

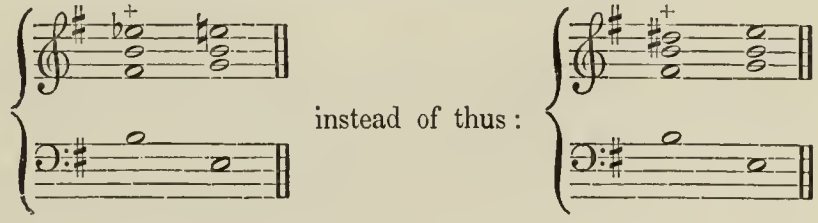
678. The fixed sounds of organs were therefore tempered with the special object of *favoring* the tonic, dominant, and sub-dominant harmonies of those scales as much as possible, as shown in the following example:



679. The five short keys were tempered so as to form nearly perfect thirds to the small black notes that are here added above or below them; and so long as composers and organists confined themselves chiefly to the use of the scales already named, the existence of the wolf to an aggravated extent in all the other scales remained a matter of no great practical importance; but as by degrees they also came to be employed, the defects of the unequal system of tuning became so much more apparent, that various methods were proposed, from time to time, with a view to their amelioration. Even at the period already named, several pieces of Church music had been written in the scales of E flat major, A major, E minor, &c.; in the former of which keys the sub-dominant triad could only be sounded thus by the then existing temperament,

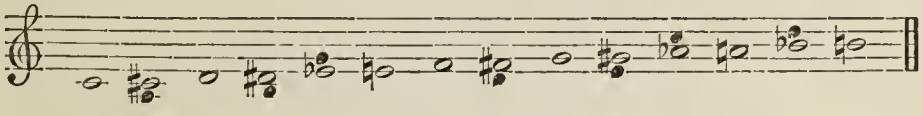


and in the latter, the dominant major triad thus,



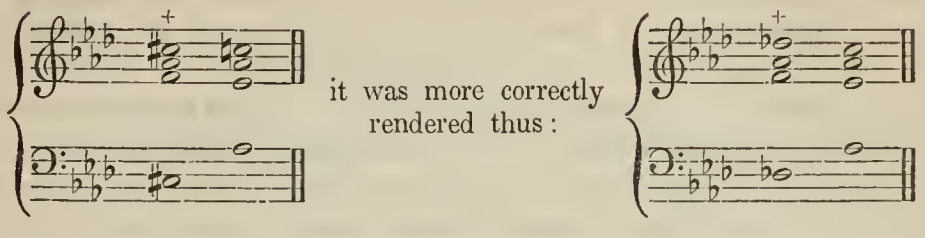
Quarter tones.

680. The earliest steps towards getting rid of the wolf, were, in England, made by introducing *extra keys* into each octave, furnished with separate sets of pipes, and which were intended to be used and others omitted when playing in certain scales. The first experiment of this nature was made in 1687, by Father Smith, who was most probably assisted in his design with the advice and co-operation of the great Henry Purcell: and it was in the fine organ in the Temple Church, which Purcell afterwards exhibited during the memorable trial, that these *quarter tones* were first made available. Two such additional keys were introduced into each octave—A flat and D sharp—by which means the chords of A flat major and B major, the two quoted above, were rendered among the best, instead of being two of the very worst on the organ. The scale of the Temple organ, with these additions, stood thus:



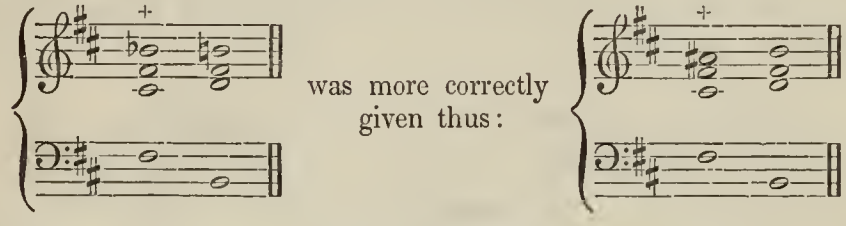
681. The result of these added sounds was received with so much favour, that, in the organ presented by Handel to the Foundling Hospital, in 1759, and doubtless constructed under his own direction, the additional tones in each octave were further increased, in number from *two* to *four*, the two new ones being D flat and A sharp, which extended the amelioration to the triads of D flat major and F

sharp major: so that, instead of the sub-dominant harmony of A flat being sounded thus,



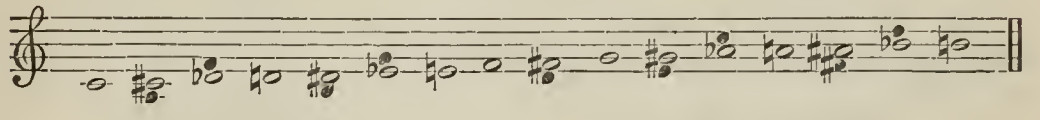
it was more correctly rendered thus:

and the dominant harmony of B major or minor, instead of being given thus,

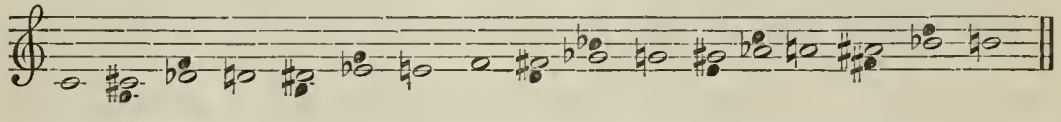


was more correctly given thus:

The scale of the Foundling Hospital organ was therefore as follows:



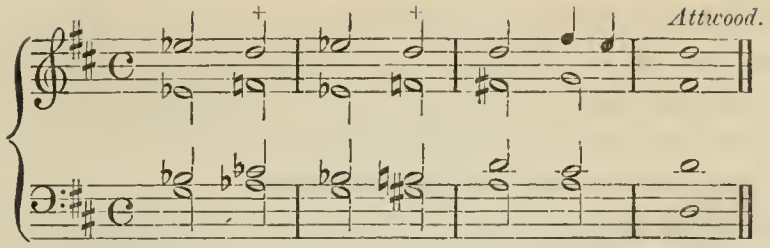
682. After this, that is, about the year 1808, Hawkes took out a patent for an organ, in which two distinct sounds were obtained from the only remaining black key, namely, F sharp and G flat, making the scale as follows:



683. Nearly a quarter of a century before this time, however, the elder Russel had made an organ with 20 sounds in the octave. At subsequent periods, others were built with a still greater number of keys in the octave; until those erected for the late Rev. Mr. Liston and Colonel Thompson had 43 and 40 keys in the octave respectively.

684. The additional sounds in the several instruments just enumerated not only answered their purpose well, but they served also to illustrate theoretically the difference between sounds which, from the force of habit, some might be apt to consider as identical. Their general adoption, however, did not follow, on account of the great cost of the extra pipes, &c.; the additional room necessary to accommodate them; and the complex machinery or key-boards required to bring them into active use.

Perfect temperament.

685. Moreover, in proportion as *theoretical perfection* in the tuning was approached, by the introduction of additional sounds, the *practical disadvantages* were *increased;* for they destroyed that ambiguity in certain harmonic combinations which is one of the greatest and richest resources of the musician's art. The beauty of an enharmonic transition consists, as all musicians know, in the "change without the difference:"

whereas, by a system of perfect tuning, all such changes as the above were made *obvious;* that is to say, the altered notation called forth other sounds, which announced and foretold the coming transition,—and, by the doubt being thus removed, the unexpected charm was entirely destroyed.

686. It will, of course, be perceived that the great practical question relative to the best method of tempering the original *twelve* sounds, so as to render all the scales *playable*, was left wholly untouched upon by these ingeniously conceived and constructed instruments; which were organs illustrating the theory of *perfect* temperament, and not *equal* temperament.

Equal temperament.

687. It was in Germany that the last-mentioned and important theme was first started and discussed; and the merit of its invention was chiefly due to the great Sebastian Bach, who demonstrated the superiority of that system over all others in the contents of the invaluable volume known to musical students under the title of "the well-tempered Clavichord;" or 48 Preludes and Fugues in all the major and minor keys. At first, this system of tuning was applied only to the progenitor of the modern pianoforte, as will have been gathered from the title of the publication just referred to; but in a short time it was extended to the organ. One of the strongest opponents to its being adapted to that instrument is said to have been Silbermann, the celebrated organ-builder; and the tradition runs, that whenever Sebastian Bach observed Silbermann among his select circle of auditors, he used to say to him, in perfect good humour, you *tune* the organ in the manner you please, and I *play* the organ in the key I please, and thereupon used to strike off a Fantasia in A flat major; the contest invariably ending in Silbermann's retiring to avoid his own "wolf."

688. The Continental organs have universally been tuned on the *equal* temperament system for nearly a century past, as the Pianofortes and Harmoniums are in this country; while those in England have for the most part been as uniformly tuned according to the old or *unequal* method, even up to the present time.

A reason in favor of unequal temperament.

689. Each system has its advocates. In favor of the unequal, the same reason which no doubt led to its adoption originally is still urged; namely, that it renders the common major scales nearly perfect.

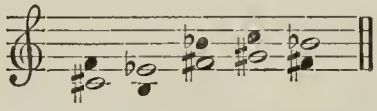
That reason considered.

690. This is undoubtedly the case; but it is at the same time an *insufficient* reason. There is now a second circumstance to be considered, which could scarcely have been taken into account in the seventeenth century; which is, that the unequal temperament causes no less than 15 out of the 24 scales to be more or less wolf-ish, commencing with the dominant or the sub-

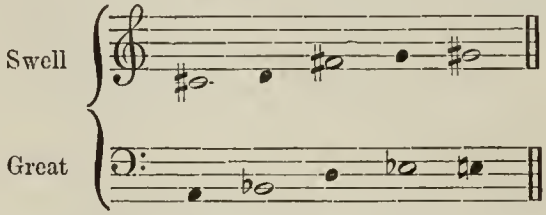
dominant harmonies of those keys the nearest related to the common scales; as, for instance, E major or E flat major, B minor, C minor, &c.; and ultimately extending itself also to the tonic triads, as D flat major, G sharp minor, &c. It, in fact, perpetuates the very defects which the quarter-tones in the one case, and the equal temperament in the other, were introduced to remove.

691. What the defects may be, to which the unequal temperament leads, will be best indicated by a few musical examples. Before, however, giving them, one or two simple practical methods may be pointed out for ascertaining whether an organ really be tuned in the manner referred to.

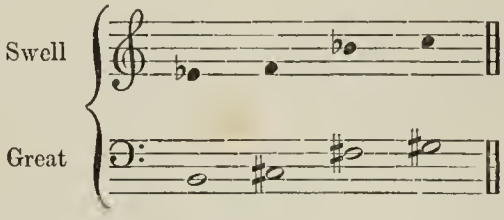
692. The scale of an unequally tempered organ has already been given, it forming the first illustration to the present chapter, to which reference might here be made (see page 140). If, on an organ so tuned, the sound of the black keys be tested in the *opposite* direction to that indicated in the illustration just named, it will become obvious to the *ear*, as it may be rendered also to the *eye*, that they form no *thirds* at all to the new notes with which they are now combined.



693. If a test by *beats* be desired, proceed as follows. Draw the ordinary 3-rank Sesquialtera in the Great Organ, and the Principal in the Swell—the Swell being fixed open—then play the following series of notes on the two manuals, very slowly:



694. It will be found that the thirds *played* on the keys, and the perfect thirds *sounded* by the Tierce in the Sesquialtera so nearly accord, that few, if any, beats will be heard. This proves that the thirds to the bass notes given in the last example are much favored; i. e. are scarcely, if at all, tempered. *Reverse* the test, thus, playing slowly, as before,



and the most horrible dissonances will ensue, because no accordance with those notes is even aimed at.

Illustrations of sacred music as sounded on an unequally tempered organ.

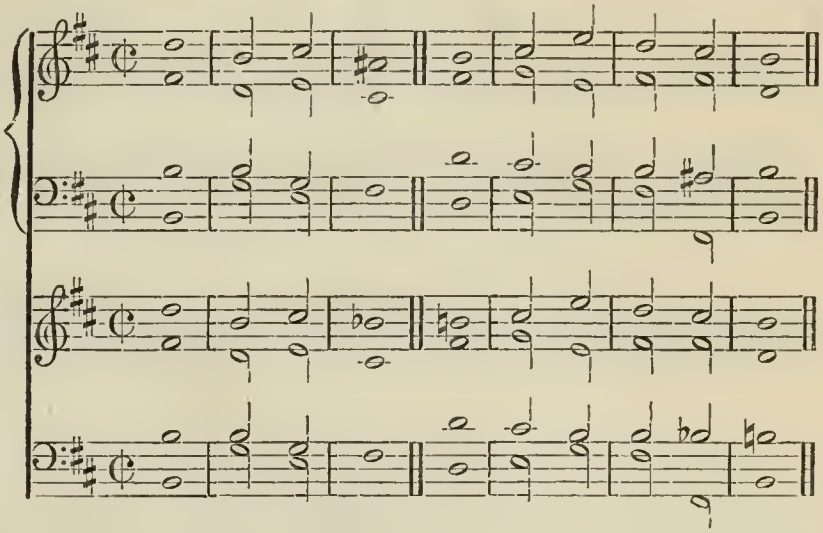
695. A few musical extracts will now be given, to show how utterly inadequate this unequal system of tuning is to the correct rendering of some of even the most simple music in common use. The quotations which follow, the number of which could be increased to any required extent, are taken entirely from Sacred compositions, and from those of comparatively ancient date. More modern examples would place the inefficiency of

such a system of tuning in a still stronger light; but the object has, in this place, been simply to show the great desirability of adopting the equal temperament, even for the humblest church organs; its great superiority for concert-room organs being all but universally admitted.

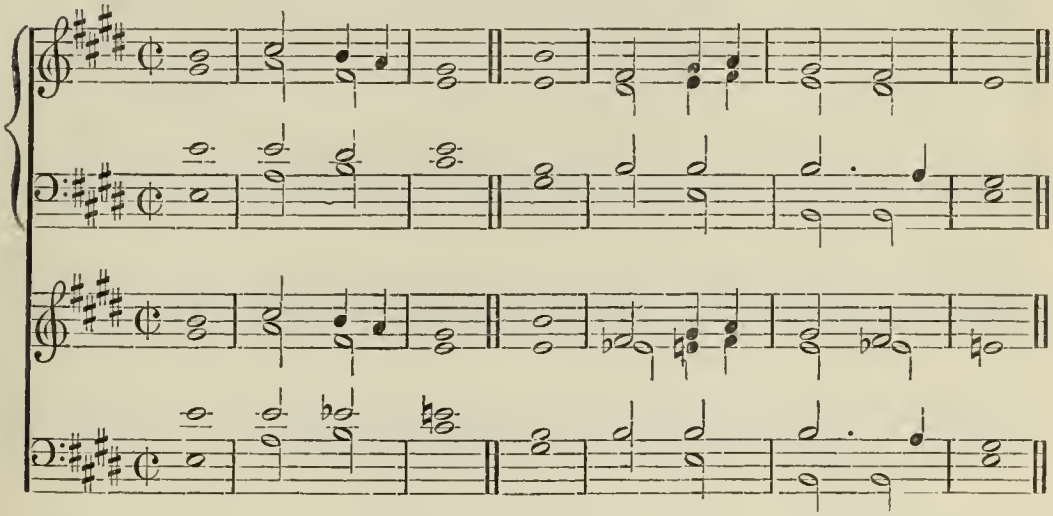
Ex. 1. *Single Chant.* DUPUIS.

As written.

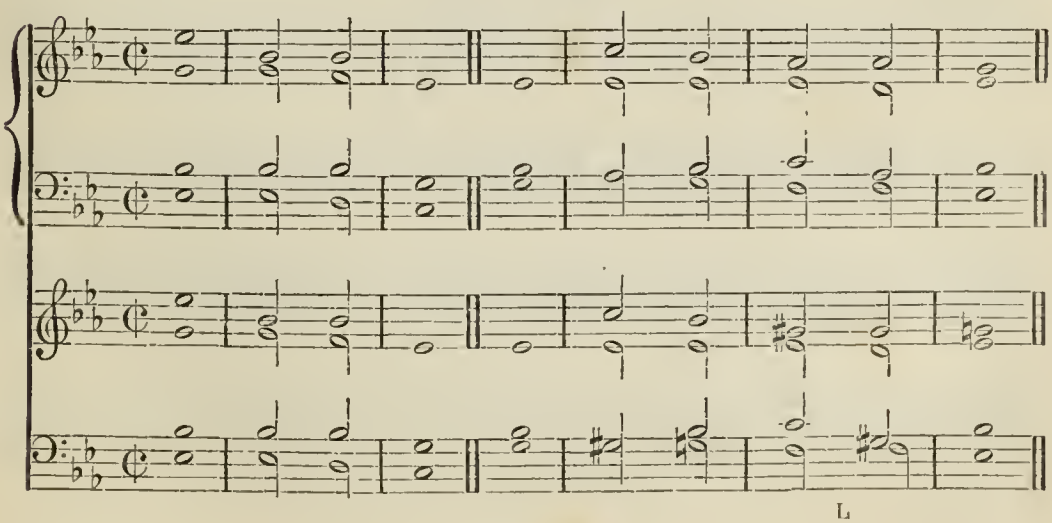
As sounded on an unequally-tempered Organ.



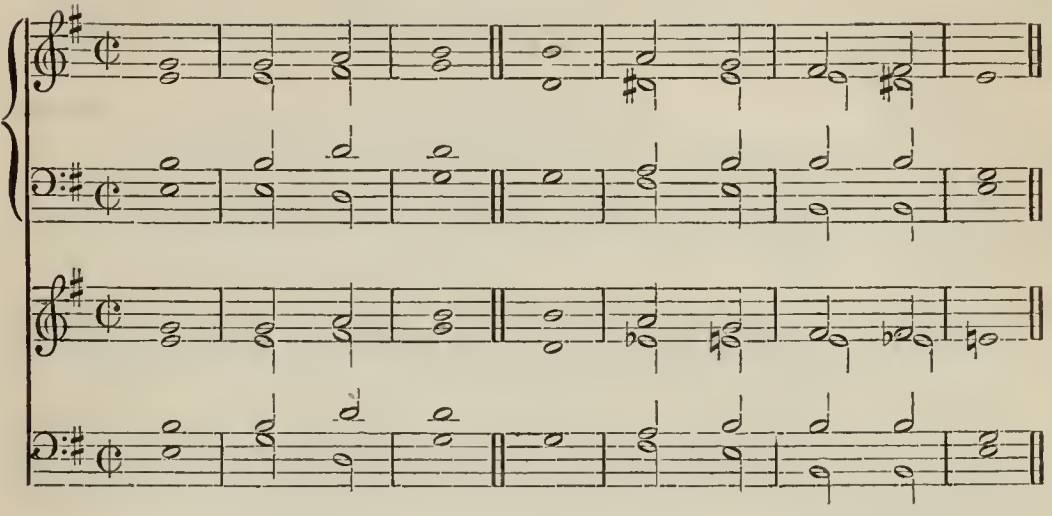
Ex. 2. *Single Chant.* HAYES.



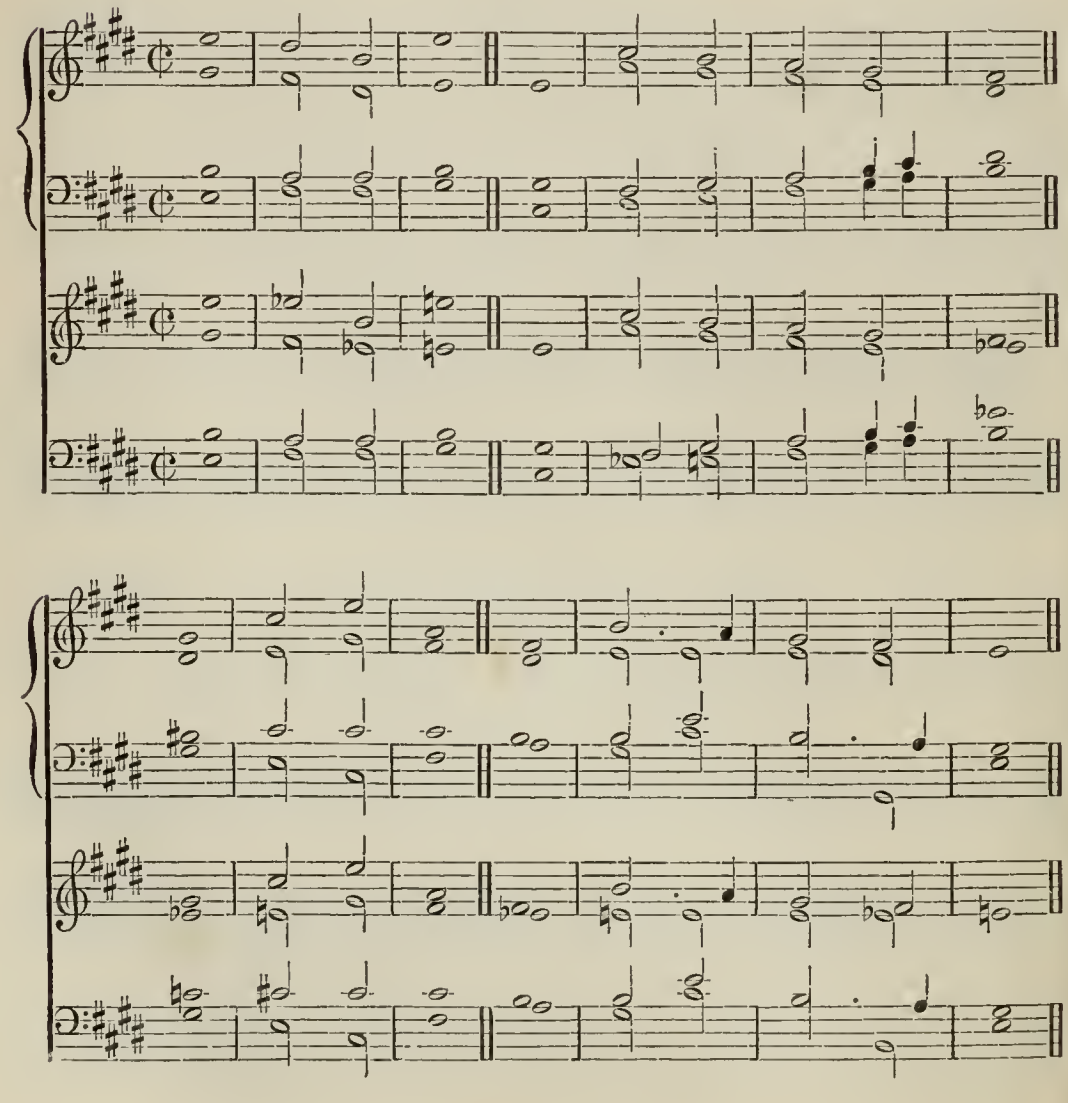
Ex. 3. *Single Chant.* BATTISHILL.



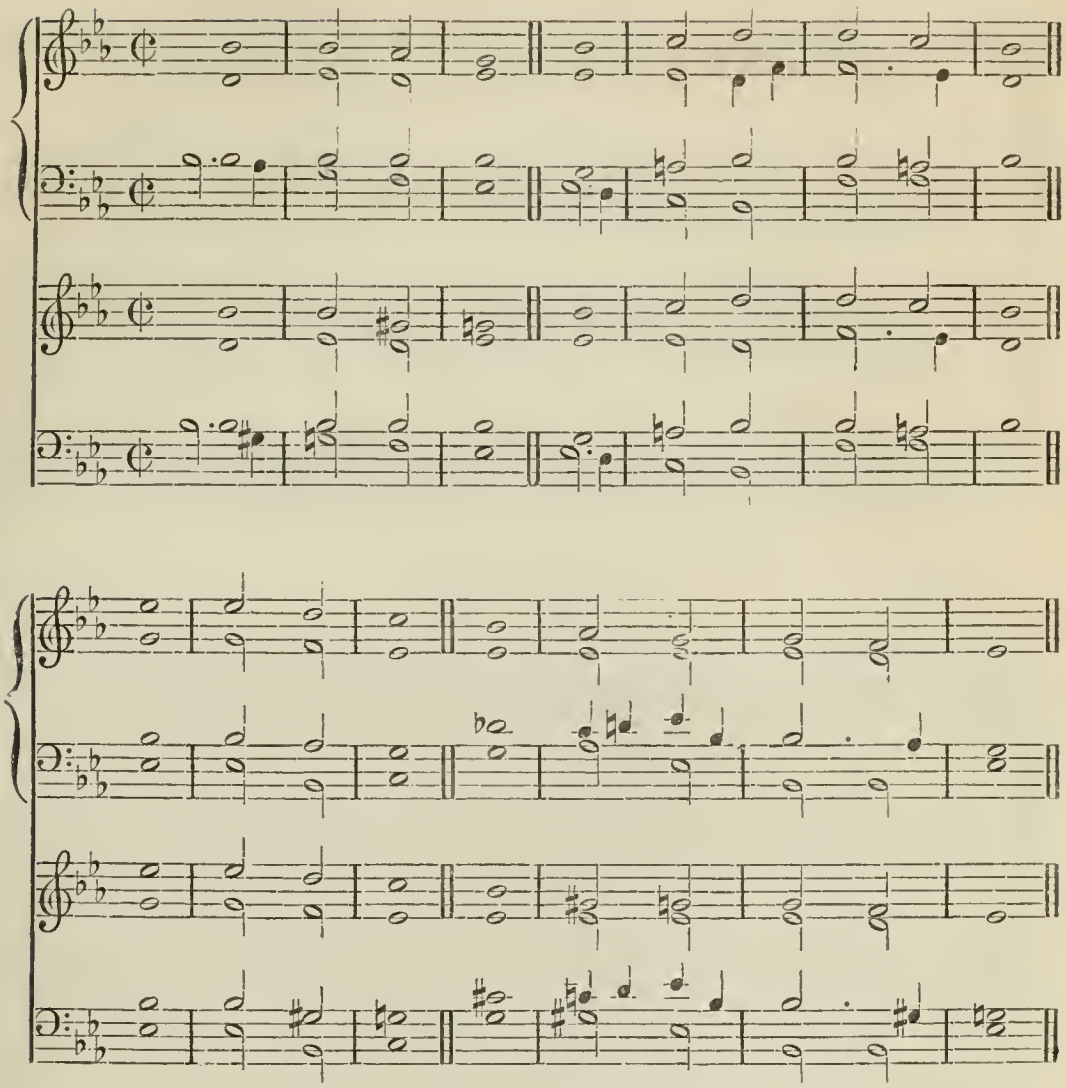
Ex. 4. *Single Chant.* Dr. Blow.



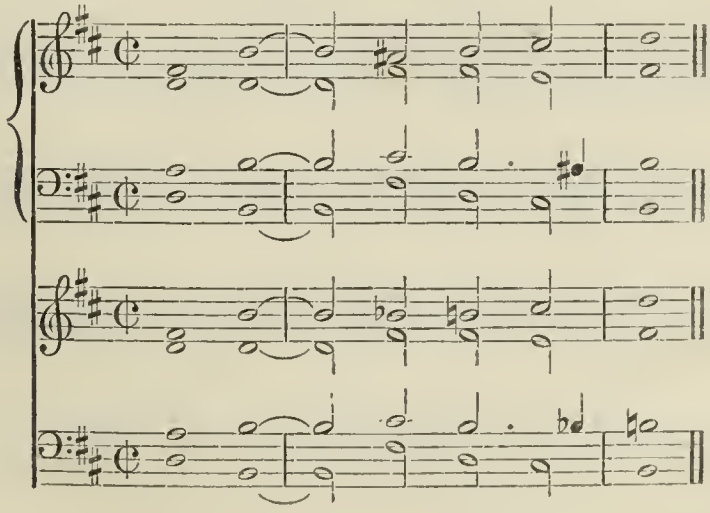
Ex. 5. *Double Chant.* Davy.



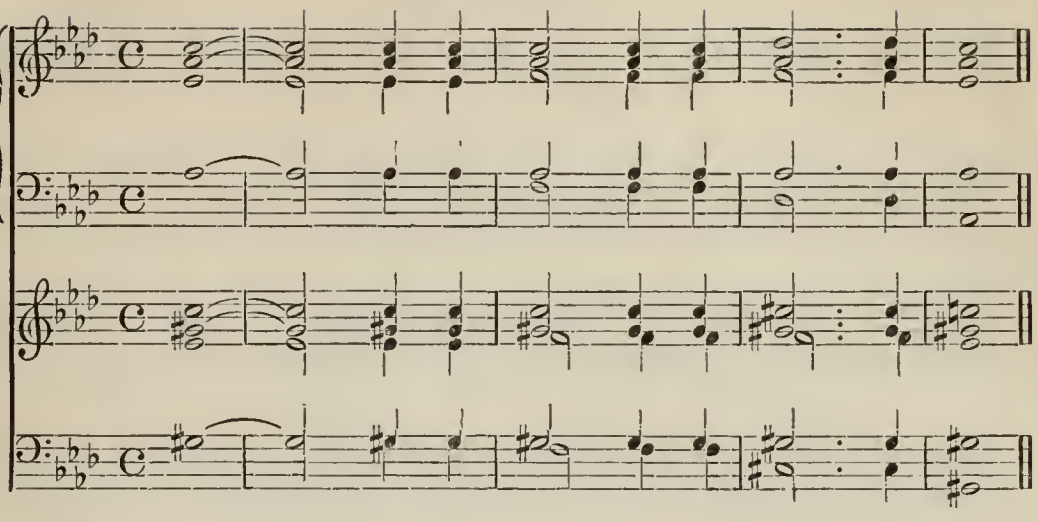
Ex. 6. *Double Chant.* LORD MORNINGTON.

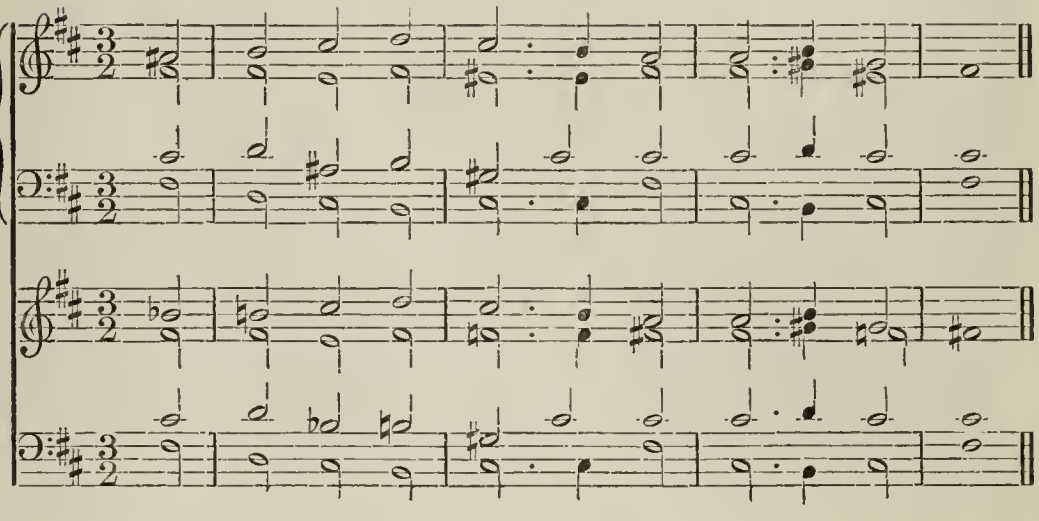


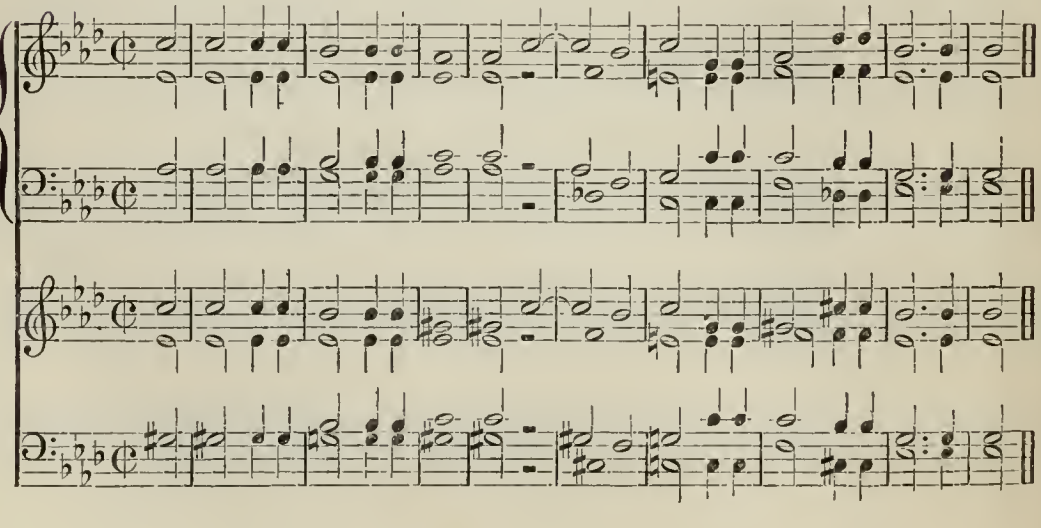
Ex. 7. *Behold now praise the Lord.* ROGERS.



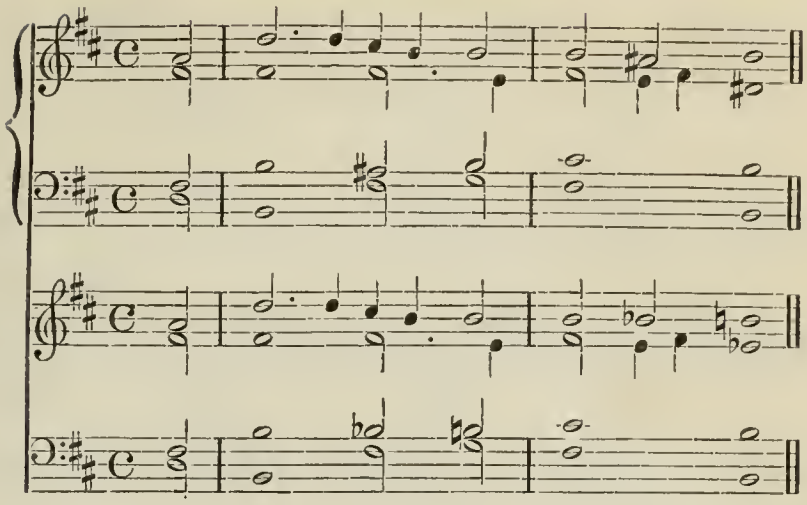
Ex. 8. *O where shall wisdom.* BOYCE.



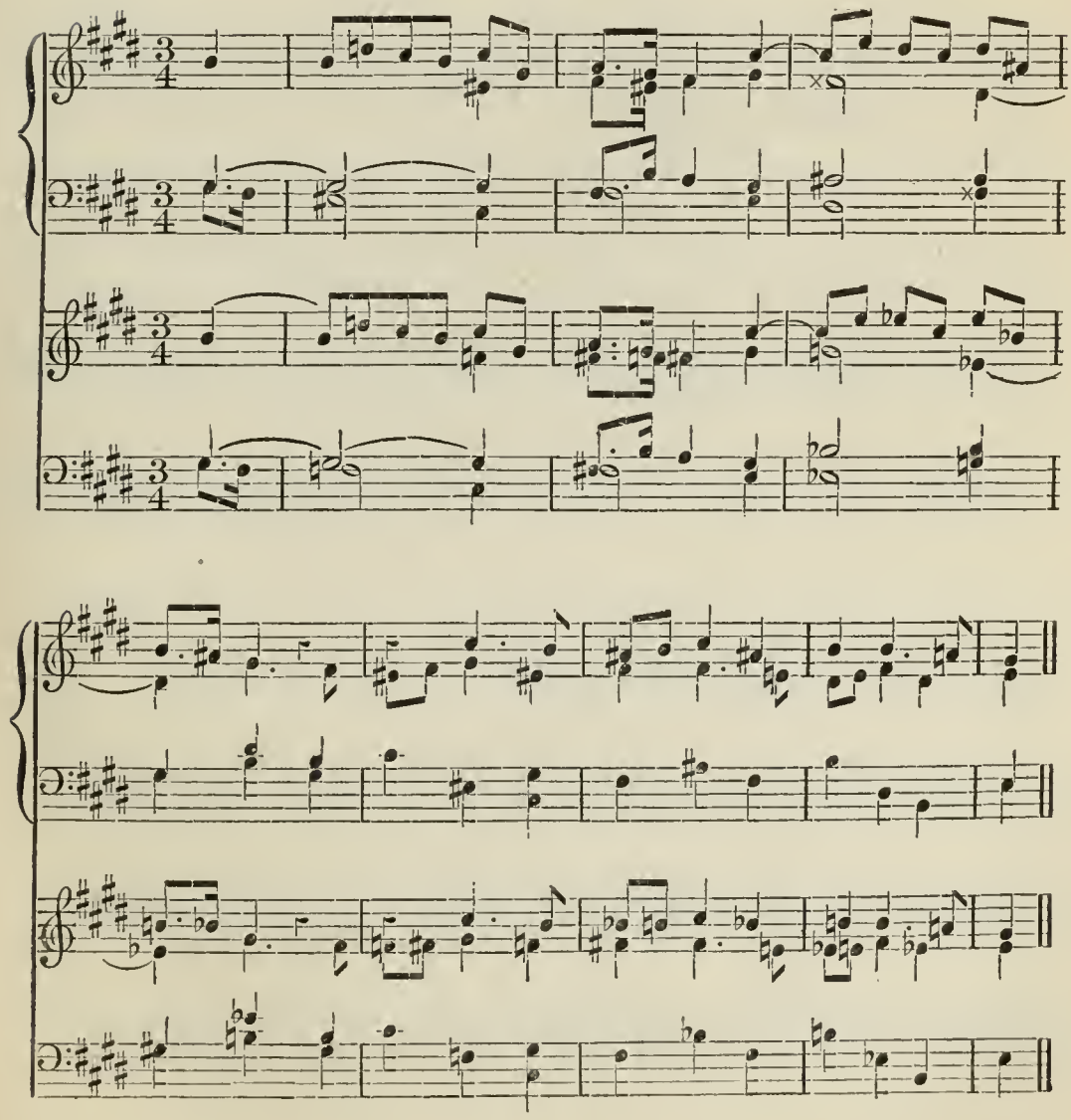
Ex. 9. *I will love Thee.* CLARK.

Ex. 10. *By the waters of Babylon.* BOYCE.

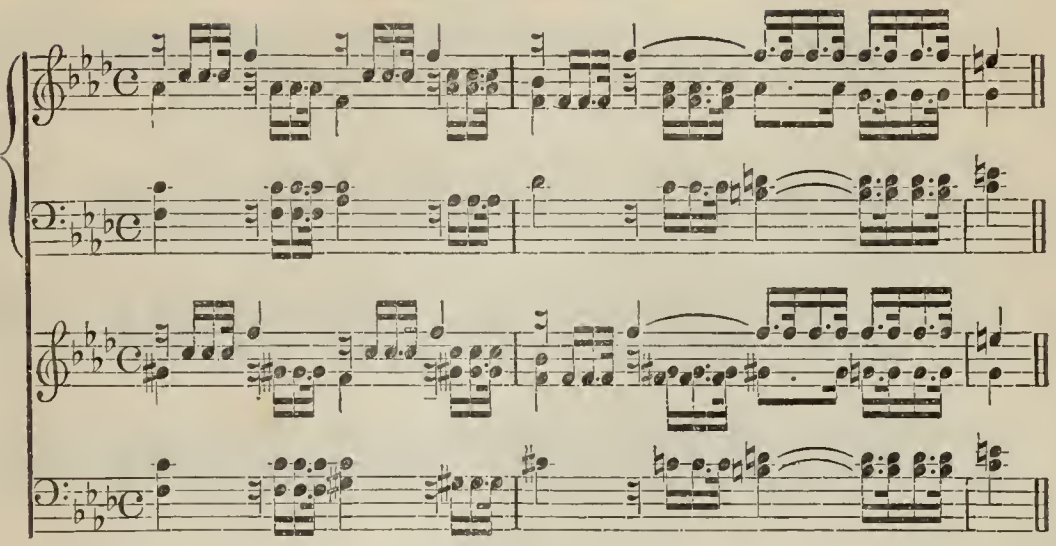


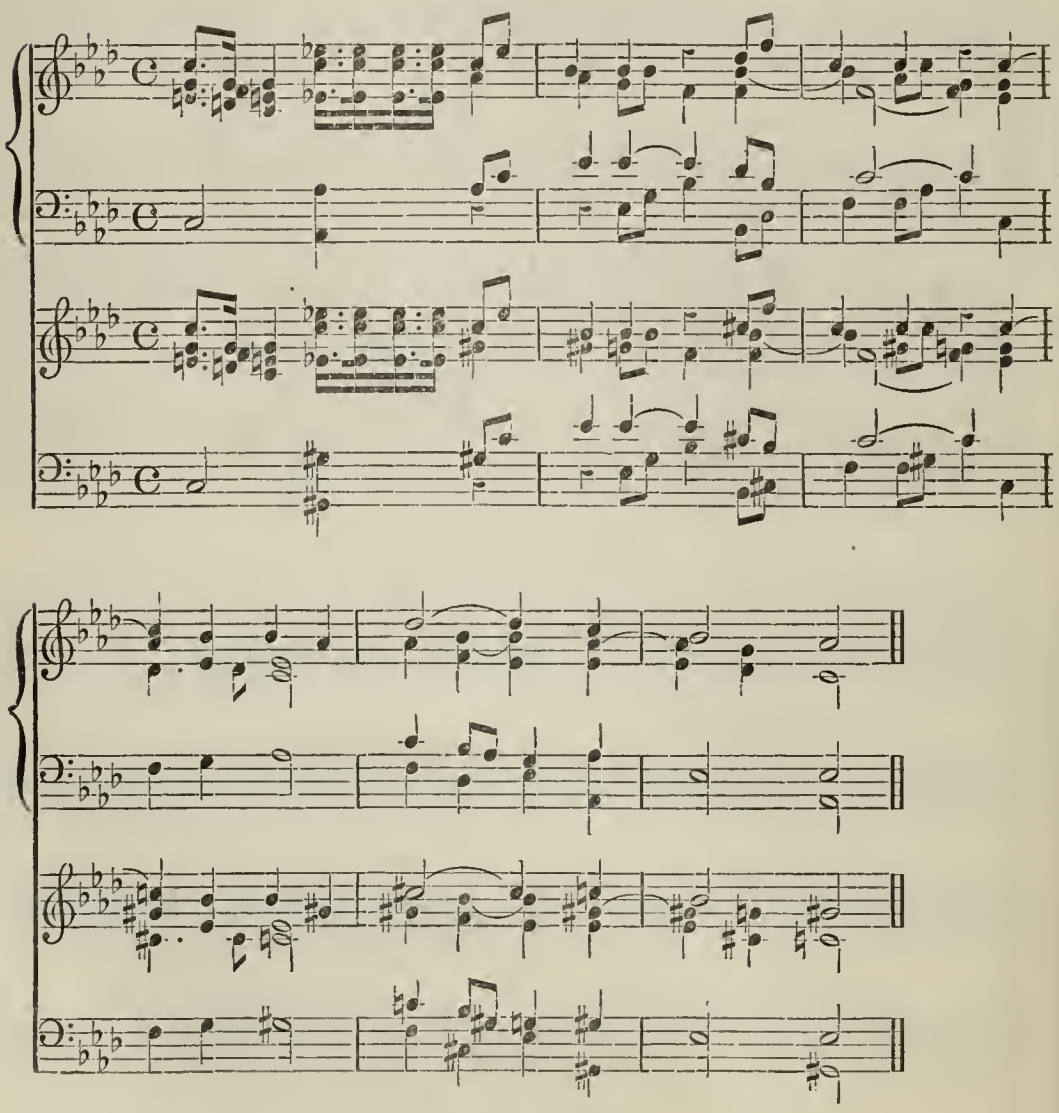
Ex 11. *The Father everlasting.* ROGERS, in D.



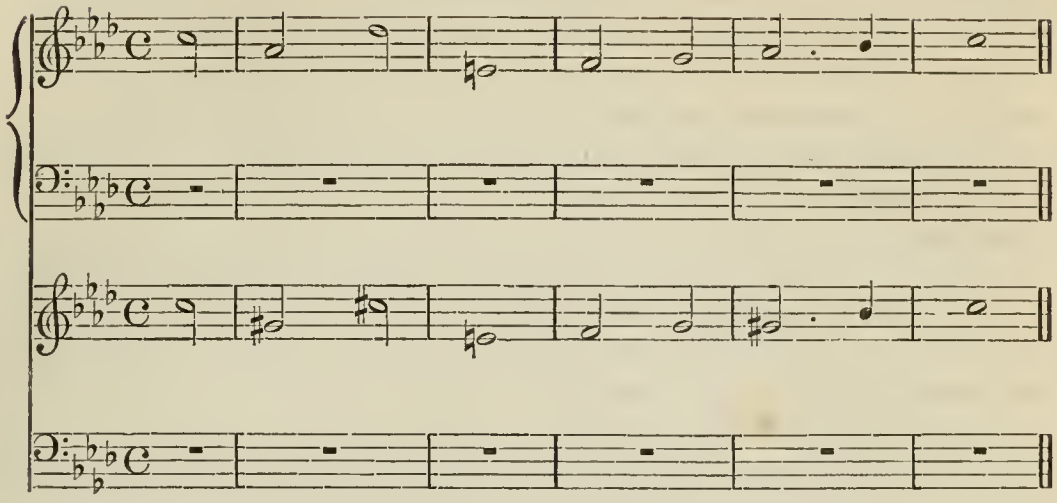
Ex. 12. *Turn thee unto me.* BOYCE.



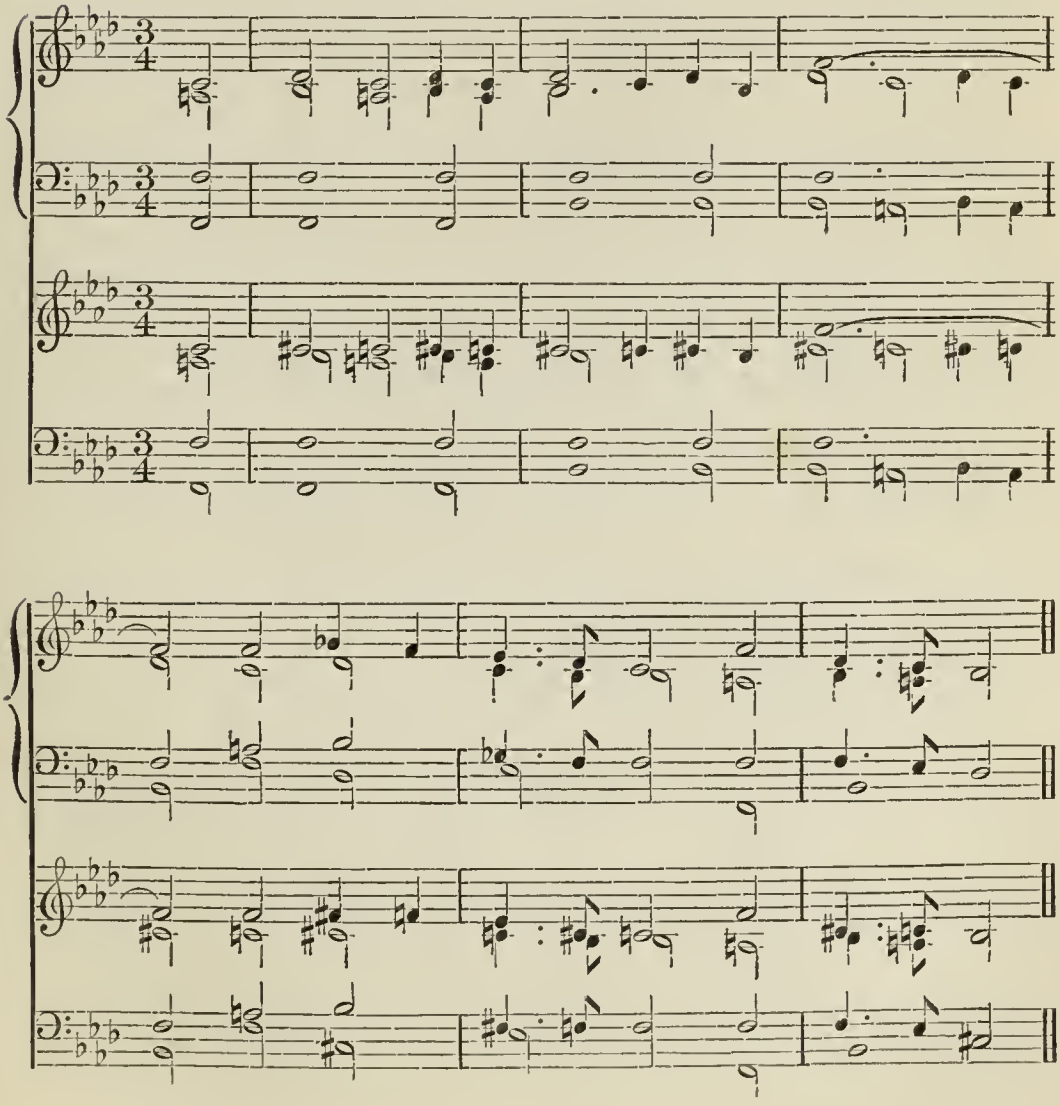
Ex. 13. *Surely he hath borne our griefs.* HANDEL.

Ex. 14. *Surely he hath borne our griefs.* HANDEL.



Ex. 15. *And with his stripes.* HANDEL.



Ex. 16. *O Lord God of my salvation.* DR. CROFT.



696. No one who is aware of what intervals a common chord is formed would desire to designate the strange accumulations of notes occupying the lower lines in the foregoing examples as specimens of "musical composition;" and it is not easy, therefore, to conceive why the crude *sounds* which those *notes* represent should be received as "harmonious combinations," save on the weak ground that the ear has, by long custom, been rendered partially insensible to their harshness. It is certain that nothing half so egregiously bad can be made to emanate from an equally tempered organ.

697. Concerning the composition from which the last example given above is taken, Dr. Burney says, in his Musical History, vol. iii, page 608—"The anthem for three voices, from the eighty-eighth Psalm, is truly pathetic and expressive from the beginning to the end; but, unluckily, the key in which it is composed (F minor) is so much out of tune on the organ, as it is usually tempered, that the effect must be doubly offensive to those who, though possessed of good ears, are unable to account for it." It would seem from this that the learned Doctor was no admirer of what German organ-builders term the barbarous system of tuning.

Unequal temperament advocated on the score that it preserves a distinct character of key.

698. The retention of unequal temperament for the tuning of organs continues to be occasionally urged in England; and the second and distinct plea sometimes set up for it is, that it preserves the distinctive character of the different scales or keys. The unequal temperament unquestionably renders all the scales either *better* or *worse* than the equal, at the same time making some of them so bad as to be unfit for use. *None* are *the same* in *both* temperaments. It, therefore, undoubtedly divides the scales into good and bad, smooth and harsh, bearable and unbearable; but, beyond this, it does surprisingly little *that is advantageous*. A few of the commonest scales are by it rendered nearly perfect, consequently but little distinction of character can exist between *them*. If there *did*, then a Service or Anthem, a Psalm Tune or Chant, could not be transposed from one of those good scales into another good scale for the accommodation of voices, as is at present frequently done, without violating the character of the keys. Any alteration of character that may be observable, consequent on transposition, is chiefly due to the *change of pitch*—a *separate* cause of variety in scales that has not always been sufficiently recognised in discussions on this subject. Then with regard to all the other scales, their "distinctive character" arises from their being more or less *out of tune*. For instance, some of those with flats have, on account of the *lessened* intervals—extreme thirds instead of perfect fourths, and extreme seconds in place of minor thirds (see examples 6, 10, 13, 14, and 16)—a melancholy, tame, and limping character: others with sharps for the signature have, on account of the *augmented* intervals—diminished fourths for major thirds, &c. (see examples 5 and 12)—an excited, restless, and stilted character: while the extreme keys, which comprise both diminished and augmented intervals, are so crude as to be altogether intolerable. See example 12. The "character of the key," therefore, does not appear nearly so distinctly among the *good* scales as among the *bad;* and as those having the *most* character are the very ones that are recommended to be *avoided*—even by those who advocate the system of tuning that produces them,—it is obvious that the preservation of the "character

of key" can form no well-grounded argument in favour of the retention of the unequal system of temperament. Scheibler*, speaking historically of the arguments that had been used by the old German theorists, a century ago, in defence of this primitive method of tuning, and which were identical with those put forth for a similar purpose in England at the present time, says, "Such a modification, or rather corruption of the scales, was called *temperament;* and, strange to say, the old theorists advocated the adoption of such unequally tempered scales, on the plea that the different degrees of deviation from the mathematical purity tended to give them a greater characteristic difference of effect, and thereby give a greater power of colouring to the musical art: a plea that represented a necessary evil in the colour of a real advantage and benefit."

699. When even the most sincere supporters of the theory of securing "distinct character of key," by means of the unequal tuning, discovered good reason for dreading its effect when it was secured, the inference was but a natural one that there must have been something inherently defective in that principle of tuning. Indeed, had it been otherwise, the most eminent organ-builders, organists, and mathematicians, German as well as English, would not for so long a period have directed their attention to devising means for *superseding* it; and which some proposed to effect by means of extra keys; others by a system of equal temperament.

Equal temperament recommended on the same grounds.

700. As much stress, however, is still at times laid on the little that the unequal temperament effects for *agreeable* distinction of key, it may not be out of place here to quote what has been advanced on the other side, i. e. in favour of the equal system of temperament. Bombet, in his life of Haydn, pages 98, 99, and 100, has given a list of keys, with observations in reference to this subject, which are here extracted.

"F major.....	This key is rich, mild, sober, and contemplative.
D minor.....	Possesses the same qualities, but of a heavier and darker cast: more doleful, solemn, and grand.
G major.....	Gay and sprightly, Being the medium key, it is adapted to the greatest range of subjects.
E minor.....	Persuasive, soft, and tender.
A flat major...	The most lovely of the tribe. Unassuming, gentle, soft, delicate, and tender, having none of the pertness of A in sharps. Every author has been sensible of the charm of this key, and has reserved it for the expression of his most refined sentiments.
F minor.....	Religious, penitential, and gloomy.
A major.....	Golden, warm, and sunny.
F sharp minor .	Mournfully grand.
B flat major...	The least interesting of any. It has not sufficient fire to render it majestic, or grand, and is too dull for song.
G minor.....	Meek and pensive. Replete with melancholy.

* An Essay on the Theory and Practice of Tuning, by Scheibler, published by Robert Cocks and Co. page 26.

B in sharps. . . Keen and piercing. Seldom used.

C major. . . . . } Bold, vigorous, and commanding; suited to the expression of war and enterprise.

A minor. . . . . } Plaintive, but not feeble.

D flat major. . . Awfully dark. In this remote key, Haydn and Beethoven have written their sublimest thoughts. They never enter it but for tragic purposes.

D major. . . . . } Ample, grand, and noble. Having more fire than C, it is suited to the loftiest purposes. In choral music, it is the highest key, the treble having its cadence note on the 4th line.

B minor. . . . . } Bewailing, but in too high a tone to excite commiseration.

E flat major. . . } Full, and mellow: sombre, soft, and beautiful. It is a key in which all musicians delight. Though less decided in its character than some of the others, the regularity of its beauty renders it a universal favourite.

C minor. . . . . } Complaining: having something of the whining cast of B minor.

E major. . . . . Bright and pellucid: adapted to brilliant subjects. In this key Haydn has written his most elegant thoughts. Handel mistook its properties when he used it in the chorus, "The many rend the skies with loud applause." Though higher than D, it is less loud, as it stretches the voice beyond its natural powers.

It is sufficient to have hinted at these effects. To account for them, is difficult; but every musician is sensible of their existence."

701. Enough is set forth in the above quotation—even allowing something for over-colouring—to argue a great superiority on the part of the equal temperament over the unequal on the question under consideration; not the least of its greater excellencies consisting in its transforming the otherwise "wolfish" key of A flat major into "the most lovely of the tribe."

Temperament, as the only source of distinction of key, questioned.

702. But, in truth, it appears doubtful whether the question of "character of key" should ever have been *so much* mixed up with that of "temperament" as it has been, since writers are by no means unanimous as to the *source* of that distinction; some even going so far as to doubt whether it exists at all, save in education and imagination.

Pitch supposed to exercise an influence in establishing the character of key.

703. In unequally tempered instruments, a distinct character of key undoubtedly exists; but it is of so untuneful a nature, that, instead of proving an *advantage*, it is a source of pain to sensitive ears, as Dr. Burney has testified in the passage quoted in paragraph 697, page 152. The equal temperament removes the cause of the crude distinction; but, in doing so, it, in the opinion of some, must also destroy all difference between one key and another. This appears to be only a natural inference; yet experience shows that on an equally tempered instrument, such as the pianoforte, for instance, a very visible distinction of key *does* exist. Some would account for this by supposing that

a sort of *unintentional* temperament must find admittance; that the tuner, unconsciously, has perhaps a bias in favor of certain keys. Others would attribute the distinction to the influence of a second and independent agency, namely, *pitch*, or the grave and acute qualities of sound. As to the manner in which that influence is exercised, they propose to account for it by supposing that, when an author composes a piece of music, he first determines his key, and then confines his ideas to the proper compass of the voices or instruments for which he is writing. Thus, in penning a vocal piece for a treble voice of average compass, if c^2 be taken as the key-note, the available range would be half an octave upwards, and a whole octave downwards; if f^1, it would be a whole octave upwards, and half an octave downwards; if a^1 flat, it would be a sixth upwards, and a sixth downwards; and so on; and that each separate melodial range has perforce its own distinct series of attendant harmonies. That *students* and *auditors*, by performing and hearing music so written, are thus gradually led to ascribe to each of the keys a specific character. In this case, however, the primary influences would appear to be the limits of the voice, and other circumstances under which the music was written, rather than any inherent and peculiar property in the *pitch*. If any specific quality ever belonged to certain sounds—of which sounds the musical scales are formed,—that quality would continue to exist; therefore, on *an alteration of pitch* taking place, such as has actually occurred, by ascent, to the extent of a semitone, since the time of Haydn, the scales that formerly had sharps for the signature, though now having flats, would still be brilliant; and those which had flats, though now having sharps, would be the reverse. Music written, in the last century, in the "golden, warm, and sunny" scale of A major, would now be heard in "the least interesting key" of B flat major; and so on; whereas no such perversion of sentiment has ever been declared to have taken place.

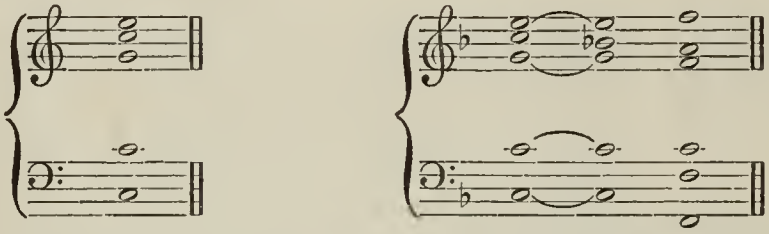
The internal resources of the musical art capable of giving any character to any key.

704. The probability is, that neither *temperament* nor *pitch*, although *both* capable of exercising great influence, have so much to do with giving "greater power of colouring to the musical art" by means of the establishment of the so-called "character of scale," as the internal resources of the art itself. For since music has become a *language*, as well as a *science* and an *art*, composers have been enabled to express *whatever they please*, in *any scale* they please. They have drawn music of a given "character," *and its opposite*, from one and the same scale. Thus, if Handel selected the "bold, vigorous, and commanding" scale of C major for the "Horse and his Rider" chorus, he employed it with equal success also for his "Dead March in Saul." If Mendelssohn adopted the same scale, "expressive of war and enterprise," for his "Military Duet," he used it no less felicitously for his sweet and peaceful aria, "O rest in the Lord." If he fixed upon the scale of G minor, "replete with melancholy," for his most pathetic second movement in the instrumental introduction to the "Lobgesang," he adopted the same "meek and pensive scale" with equally perfect success also for two of his most vivacious "Scherzos," those in the "Ottetto" and the "Midsummer Night's Dream" music. Weber selected the "awfully dark and tragic" scale of D flat major for his inspiriting "Invitation to the Dance." But to whatever circumstance, or combination of circumstances, the distinction of scale observable on an

equally tempered pianoforte or organ is to be ascribed, one thing is evident;—if the unequal temperament was felt to be *insufficient* for the purposes of church-organ accompaniment in the *seventeenth* century, as is evidenced by the unwearied attempts that were made to *get rid* of it, it cannot be sufficient in the nineteenth, now that the use of a far greater number of scales has become unavoidable, from a variety of causes.

Characteristics of equal temperament.

705. We have *heard* how "out of tune" the unequal tuning makes some of the scales that are even in constant use; and we have *seen* the cause. The equal temperament removes that cause, by, among other things, tempering the sound of all the short keys, so that they will serve either as the *flat* to the white key *to the right*, or as the *sharp* to the white key *to the left*. Its influence in the enharmonic scales, which is considerable, is not here dwelt upon. The equal temperament, by rendering each of the twelve fixed sounds susceptible of answering two or three distinct purposes, possesses advantages, as well as a degree of practical simplicity and efficiency, quite peculiar to itself.

706. In distributing the wolf equally among all the scales, the major thirds in a few common keys are made rather sharper than in the unequal temperament. This—the most grave objection taken to the equal system of tuning—never amounts to a striking defect, while in many instances it necessarily becomes a positive beauty. It is well known that the most perfect organ and instruments in existence, the human voice and the violin, can produce all the gradations of the enharmonic scale; yet both singers and performers on string instruments *prefer* making the leading note *not* a perfect third to its root, but *sharp*. And as every major triad, at the same time that it forms the tonic triad of one scale, c for instance, also forms the dominant of the fifth below, f;

it follows that its third, e in the above examples, as the leading note of that dominant harmony, accords more closely with the custom observed by the best practical musicians, from the very circumstance of its being sharper than perfect. Besides this, the sharp thirds infuse a freshness and spirit into the common keys, which according to the old temperament they do not possess; added to which, they relieve the extreme keys from that undue proportion of the dissonance which renders them scarcely bearable on an unequally tempered organ. Besides this, the equal temperament much improves the effect of the whole series of minor scales; in which, it will be recollected, a very considerable proportion of the English church music is written. Again, as nearly all well-cultivated voices have been tutored at an equally tempered pianoforte, a similarly tempered organ must prove the best accompaniment to them. No singer would think of sounding for semitones such intervals as those which occur on an unequally tempered organ between D and E flat, or between G sharp and A; or such as those between A flat and B flat, or between C sharp and

D sharp for whole tones; or such as those between A flat and C, or between B and D sharp for major thirds. In this respect, singers have frequently been censured for "singing out of tune," when the fault has rested solely with the unequal temperament of the organ on which they have been accompanied.

707. Then, in practice, the equal temperament is the only system that affords unfettered facility for the transposition of a piece of music (when that may be required), without distorting the intervals of its melody, or rendering the progress of its harmony crude and exaggerated. In this variable climate, it frequently happens that, by transposing a psalm tune or a chant a semitone or a whole tone lower, the voices of a choir or congregation may be spared much exertion and unnecessary fatigue. Besides this, organs vary more or less in pitch; and if an instrument be tuned very high, the music can then be transposed without harshness being imparted to it. In the *Harmonicon* for 1824, a correspondent states that "till of late years the organ in St. Paul's Cathedral was half a note above the usual standard, and the organ-part of the music performed at the Feast of the Sons of the Clergy was therefore obliged to be transposed half a note lower than the other parts, for the accommodation of the organist." It is easy to conceive how horrible several movements in Handel's Dettingen Te Deum must have sounded when thus transposed into D flat, A flat, B flat minor, &c. in consequence of the unequal temperament of the organ. A recurrence of such untuneful missoundings in St. Paul's is now permanently averted, the instrument in that cathedral having been recently re-tuned on the equal temperament principle, owing to the enlightened views entertained by the present organist, Mr. Goss. And it is worthy of observation, that, at the Bicentenary Festival Meeting of the Sons of the Clergy held in that edifice this year (1854), it was universally remarked "how well in tune the voices were with the organ," the fact being that the organ had never before been in tune with the voices.

708. One of the earliest and most earnest advocates, in England, for the application of equal temperament to the organ was the late Dr. Crotch—himself a very great authority,—who directed attention to the subject, on the last page of the second edition of his "Elements of Musical Composition," in the following words:—"The author cannot but regret that the preference of English organists for the old method of tuning has been (as he is informed) hitherto so strong and determined, as to have resisted and repelled the attempts made to introduce the equal temperament into our cathedrals and churches. He has for many years uniformly recommended that this system should have a fair trial, upon the principle that as all tempered fifths and thirds offend the ear, those systems which contain such as are most tempered and most discordant cannot be preferable; especially in an age when the keys which have four sharps and three flats can no longer be excluded from general use. It has at length been fairly tried, and, having carefully examined it, he feels convinced that its practicability and superiority are as unequivocal on the organ as they are allowed to be on the pianoforte, and on all other instruments which contain only twelve different notes in each octave. He continues to press these opinions, not merely because they are his own, but because, in so doing, he is contending for the far higher authority of the judgment and practice of one whom, he trusts, his opponents must venerate and admire—the greatest of all composers for his sacred instrument—

SEBASTIAN BACH."

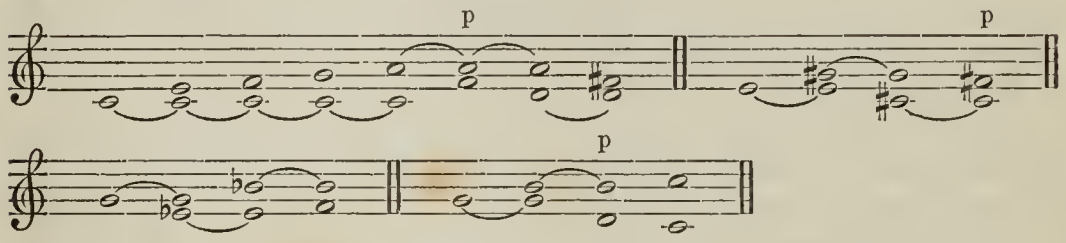
CHAPTER XXVI.

THE TUNING OF THE ORGAN.

Laying the bearings; and extending their influence to the Stops generally.

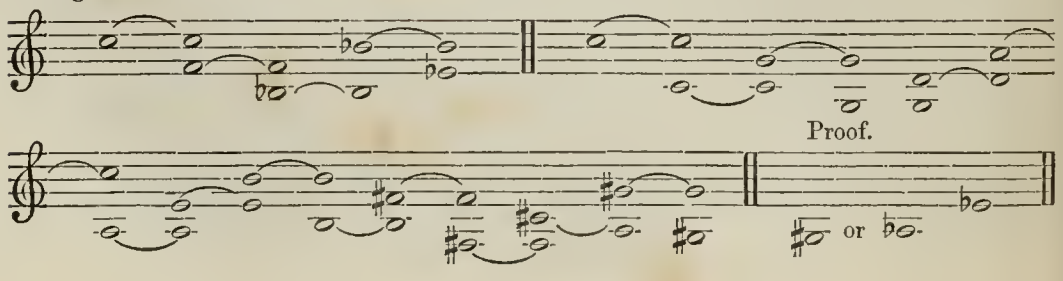
709. THE first step taken, when tuning an organ, is what is technically termed "laying the bearings." This process, after adjusting the starting sound to the pitch of the tuning-fork, consists in tuning the remaining eleven sounds of the octave by intervals of third, fourth, fifth, sixth, or octave, up or down as the case may be, and at the same time of making those intervals "bear" nearer towards or farther from the sounds from which they are being calculated than if they were being tuned absolutely perfect.

710. The following scheme exhibits one of the most approved methods of laying the bearings on the unequal temperament principle:



The bound note is in each case supposed to be tuned; the other is the one to be adjusted. In laying the bearings, all the thirds, fourths, and sixths, that are tuned upwards, are made a little sharp, and those that are tuned downwards, rather flat. The fifths, on the contrary, are tuned a slight degree flat upwards, and sharp downwards. As the tuner proceeds with his work, he occasionally tries the temperament of a note just tuned with some other note previously adjusted, to ascertain whether the bearings are being laid correctly. These references are called *trials* or *proofs*, and are made by adding the major third, fourth, or sixth, above or below, to the note just tuned. If the intervals upwards prove to be rather greater than perfect in all cases, except between c sharp and f sharp, which should be rather flat, all is right; but if otherwise, then some of the previous bearings are not quite correct. The proofs are, in the above scheme, indicated by the initial letter p.

711. In laying the bearings according to the equal temperament system, the tuning is frequently proceeded with by fifths and octaves only, as shown in the following example:

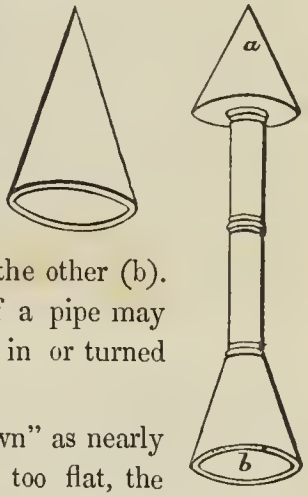


712. The bearings are laid in and about the middle octave and a half of the Stop, as will be perceived on referring to the notation of the two last examples; and the Stop usually selected for the purpose is the Principal, the pitch of that Stop being the medium one between the Unison and small Stops. The bearings having been laid, the remainder of the Stop is tuned in octaves to the pipes already adjusted. After this, the Unison Flue-stops are tuned, and then the smaller Stops; the Reeds being left till last. The fifth and third-sounding Stops, as also the fifth and third-sounding ranks of the Compound-stops, are tuned in absolutely perfect thirds and fifths to the Foundation-stops.

How the pitch of the several kinds of organ-pipe is altered.

713. *A Large Open Metal Flue-pipe* has its pitch raised by cutting away a ring of the metal from off the top of the pipe, and is lowered by soldering a ring on. Or the pipe is furnished with a sliding-cap or cylinder, which is slipped up or down, according to whether the pitch of the pipe is to be lowered or raised. Sometimes a large pipe is tuned by a slit made in its back at the upper end. This is particularly the case with Front Pipes. By bending the two edges apart, so as to leave an aperture, the pitch of the pipe is sharpened, and by closing them, it is flattened.

101. 102.



714. *A Small Open Metal Flue-pipe* is tuned by an instrument constructed for the purpose, that is conical in shape, and called a *Tuning-horn.* Tuning-horns are of many different sizes, all of which come into requisition in the course of "tuning an organ through." The larger ones consist simply of a hollow Cone (fig. 101), made of brass; the smaller, of a handle (fig. 102) with a solid metal Cone at one end (a), and a hollow Cone at the other (b). Through the instrumentality of a Tuning-horn, the top of a pipe may be contracted or expanded; i. e. its edge may be drawn in or turned out as occasion may require.

715. All the Flue-pipes in an organ are first "cut down" as nearly as possible in tune. If any pipe is still a slight degree too flat, the pointed end of the cone is pressed into the aperture at the top of that pipe, which turns the edge a little outwards, and so slightly raises its pitch. If, on the contrary, a pipe is a little too sharp, the hollow part of the cone is forced over the top of that pipe, which presses its edge inwards, and thus has the same effect that very slightly lengthening the pipe would. The pipes are therefore first cut down as nearly in tune as may be, and the tuning-horns are then used for their nicest adjustment.

716. *A Large Open Wood Flue-pipe* is sharpened by cutting the body of the pipe shorter, and flattened by nailing a piece of board as far over the open end of the pipe as is necessary to make it give its true note.

717. *A Small Open Wood Flue-pipe* has a metal shade fixed into the upper end of the back of the pipe. To flatten the pitch, this shade is bent down over the orifice of the pipe; to sharpen it, the shade is raised.

718. As the Compound-stops have several pipes to a note, and all these would of course sound at the same time, and be apt to confuse the tuner, a small *mop* (fig. 103) is thrust into each pipe of the given note, excepting the one about to be tuned, to silence them. Sometimes the various ranks of pipes that form a Compound-stop are governed by as many small sliders, capable of being drawn separately. Where this is the case, mops are not used, as the small special slider to a single rank of pipes can then be drawn without disturbing any of the others.

103.

719. *Stopped Metal Pipes*, whether entirely or partially closed, are furnished with a cap, and by this they are occasionally tuned. By pressing this cap down, the vibrating column of air within the pipe is shortened, and the sound of the pipe is therefore raised, and *vice versâ*. This mode of tuning Metal Stopped Pipes is, however, more prevalent in Germany than in England, in consequence of the Quintaton and some other Stops having fixed ears and beards. In England, Stopped Metal Pipes, which have generally very large ears, are more frequently tuned by those ears. By bending them nearer towards the mouth of the pipe, they lower the pitch; and by bending them outwards, they, on the contrary, raise it.

710. *Stopped Wood Pipes* are closed with a stopper, that is forced *into* the upper end of the pipe; and in this respect differs from the cap of the Stopped Metal Pipe, which *encloses* the top of the body. Its influence, however, is the same; namely, that of sharpening the pitch of the pipe the further it is pressed down, and of flattening it, the more it is drawn upwards.

721. *Reed Pipes* are tuned by means of the tuning-wire, on raising which, the vibrating portion of the tongue is lengthened, causing it to give a deeper tone; and on depressing which, the vibrating portion of the tongue is shortened, and the pitch consequently raised.

The pitch of the organ altered by the heat and cold in different seasons. The extent of this alteration.

722. The pitch of the organ is affected to a considerable extent by the altered temperature of the atmosphere at different seasons of the year. This fact was satisfactorily elucidated by the late Dr. Smith, Master of Trinity College, Cambridge, who has given the results of his experiments, in his work on Harmonics, page 192, 2nd edition:—"I found," he says, "that the particles of air in the cylindrical pipe, called d^1, in the middle of the Open Diapason, made 262 complete vibrations, or returns to the places they went from, in one second of time. This experiment was made in the month of September, at the time when the thermometer stood at temperate, or thereabouts. But, upon a cold day in November, I found, by a like experiment, that the same pipe gave but 254 complete vibrations in one second; so that the pitch of its sound was lower than in September by something more than $\frac{1}{4}$ of a mean tone."

723. "And, upon a pretty hot day in August, I collected, from another experiment, that the same pipe gave 268 complete vibrations in a second of time; which shews that its pitch was higher than in November by almost half a mean tone."

724. "By some observations made upon the contraction and expansion of air, from its greatest degree of cold in our climate to its greatest degree of heat, com-

pared with Sir Isaac Newton's theory of the velocity of sounds, I find also that the air in an organ-pipe may vary the number of its vibrations made in a given time in the ratio of 15 to 16, which answers to the major hemitone, or about $\frac{7}{12}$ of the mean tone, and agrees very well with the foregoing experiments."

725. The influence of a change or rise in the temperature on the pitch of an organ, is sometimes rather strikingly illustrated during the evening meeting of large congregations, and also in concert-rooms; and it is not unfrequently also attended with some temporary inconvenience. On account of the church or room being filled with people, the temperature soon rises; the atmosphere in and around the pipes of those parts of the organ that are exposed to it undergoing a similar change. The metal pipes themselves also become warm from the heated air coming in contact with them; some metals and compounds, however, being sooner influenced than others. When the parts of the organ in question are played, supplied as they now are by a warm air, and with their pipes also warm, they are found to sound much sharper than before. The Swell pipes, however, supposing the shutters of the box to have been kept closed, are surrounded by an atmosphere of the original temperature, the heat not having been able to penetrate through the box; they, therefore, remain cool; and the warm air from the bellows as it passes into them becomes chilled and is reduced to its original density; the consequence being that the Swell, at its unaltered pitch, sounds, perhaps, a quarter of a tone flatter than the Great organ. This non-accordance of pitch is often very detrimental in its effect; but it can generally be obviated by fixing the Swell open, whenever the organ is not being used during the evening, so as to allow the warm air to reach its pipes, and raise their pitch with the rest of the organ. Care should afterwards be taken to leave the Swell open all night, that its pipes may cool with the other parts of the organ; or it may be too sharp when next used. The writer has known a concert-room organ to rise as much as a semitone in pitch in the course of an evening's performance, when the temperature has very much increased.

726. When an organ has been thrown much out of tune by a great change of temperature, it will be found that the Flue-stops are not so much at variance among themselves, nor the Reeds, as that one class of Stops has bodily separated from the other. This change is commonly attributed to the Reeds, which are said to have "gone flat,"—Reed-pipes being rather proverbial for their instability of pitch;—but in this instance the alteration appears to rest rather with the Flue-stops.

727. A simple and ready illustration of the influence of heat in raising the pitch of a Flue-pipe may be obtained in the following way. Take out the top pipe of the Dulciana, if it be in tune, and hold its body in the hands until it becomes perfectly warm, and then return it into its place, and sound it with the Stopped Diapason. It will then be found to sound very sharp. This is because the warm pipe raises the temperature of the air as it passes through it. If the two pipes are allowed to continue to sound together, a rapid beat will at first be heard; but as the current of air gradually cools the pipe, the beats will become slower, until they at last entirely disappear; as the pipe, on attaining its first temperature, returns to its original pitch.

728. As to the cause of the change of pitch, from alteration of temperature, some have been inclined to attribute it partly to the expansion of the metal in warm weather, and its contraction in cold; and partly to the lighter density of the atmosphere in summer than in winter. Dr. Brewer, in his recently published work on "Sound and its Phenomena," page 255, says, "the reason is, an increase of temperature increases the *elasticity* of the pipes; in consequence of which, they vibrate somewhat more quickly, and render a higher note." This refers to Flue-pipes. With regard to the tongues of Reed-pipes, which are of brass, as the heat expands them, it would be supposed that they would vibrate slower, and produce a lower sound; but if their elasticity also is increased, the one influence may to some extent balance the effect of the other.

729. As being connected in some degree with this subject, reference may be made to the cause of the draught that is so generally felt to issue from the region of the keys of an organ. The warmer atmosphere, as it comes in contact with the numerous metal pipes, becomes chilled; and its density being increased, it descends. In this manner a constant eddy is produced, resulting in the disagreeable effect referred to, and which has been attributed to almost every cause but the right one.

CHAPTER XXVII.

THE PITCH TO WHICH AN ORGAN SHOULD BE TUNED.

The question a most interesting one.

730. THE question as to the pitch to which an organ should be tuned, introduces to consideration several very interesting particulars. A concert-room organ would, as a matter of course, be tuned up to the present concert-pitch, in order that it may accord with the orchestral instruments. With regard to church organs, however, this same question cannot be satisfactorily answered in so brief a manner. There are several circumstances which first demand attention, particularly if the establishment of a Choral Service is contemplated.

The presumed lower pitch of two centuries since.

731. Much has been written, at various times, to show that the musical pitch has been gradually rising for the last two centuries; and the opinion has even been expressed, that in Tallis's time it was some two tones lower than it is now.

The difficulties inseparable from that theory.

732. The difficulty, or rather impossibility, has been to reconcile this theory with the *notation* of the venerable pièces of church harmony of the sixteenth and early part of the seventeenth centuries. All who have been accustomed to assist in the Choral performance of the Services and Anthems of the early English Church composers, must have observed that the parts, generally speaking, lie so low for the voices that they can be sung only with some difficulty, even at the present supposed elevation of a major third above the original pitch; and this circumstance has naturally led to much speculation as to whether they ever *could* have been sung at a pitch much, if at all, below that in present use.

733. Several different theories have been propounded, with the hope of settling this by no means unimportant question.

734. Some have supposed that the range of the human voice must have been lower at that period than it is now; others, that the composers could not have studied the compass and convenience of the voices for which they wrote; while others maintain that the compositions in question were not contemplated by their authors to be sung to any definite pitch, but were intended to be transposed, to suit the voices, as occasion might require. All these explanations, however, are accompanied by some circumstance that proves fatal to its unqualified reception. Let us examine them in the order they are above given.

The compass of the human voice supposed to have changed.

735. It must be needless to insist on the extreme improbability of the supposition that nature has found it necessary to *revise* that which has always been ranked among her most perfect works; namely, the vocal organ of the human species; particularly as there exists no real difficulty to render the retention of so unseemly an hypothesis necessary. But were it otherwise, the questionableness of such a theory is soon rendered evident by making an analysis of the music of the period already alluded to. In the Services of Tye, Tallis, Bird, Gibbons, Bevin, Farrant, Hilton, and others, the *notation* of the treble part in no case ascends higher than d^2, the fourth line in the treble; while in a few instances it descends as low as tenor a, the second line below. The bass constantly ranges down to F F, and sometimes even to E E; and the inner parts lie proportionably low. The Anthems of the same composers slightly exceed the above upward range in the treble part; but that only rarely. Now, if the *pitch*, at the time alluded to, were some two tones lower than at present, the above writers must have considered the *sound* corresponding with the modern b^1 flat, or b^1 natural, the third line in the treble, as marking the full average upward range of treble voices, and an occasional tenor f, the fourth line in the bass, as not too low for them; and further, they must have viewed D D flat, and even C C, the second line below the bass, as sounds quite within the range of the ordinary bass voices;—ideas certainly most opposed to our knowledge and experience of the compass and capabilities of the several voices in existence in the present day. But, inasmuch as the theory of the former existence of a complete series of different, that is, deeper voices, rests solely on the presumed lower pitch of the seventeenth century—and this latter point is not yet proved,—acquiescence in it may for the present be fairly withheld.

The old composers supposed not to have consulted the convenience of the voices they wrote for.

736. With regard to the second suggestion, "that the composers could not have studied the compass and convenience of the voices for which they wrote;" the answer to this must depend entirely on the decision arrived at in reference to the former question, and, therefore, may also stand over for a time.

The early English composers supposed to have written without regard to any definite pitch.

737. The third supposition is, "that the compositions in question were not contemplated by their authors to be sung to any definite pitch." This, however, does not meet the difficulty. Unless the old English treble voices were as deep as the modern counter-tenors, and all the other voices proportionably lower, Tallis, Gibbons, and the other church composers of the period, must invariably and intentionally have written their music in a pitch in which it could *never* have been sung, and have thus rendered recourse to transposition not simply a matter of occasional expediency, but one of constant necessity. Nay, more, as their Services, &c. were from the first intended to be accompanied by the organ (the composers themselves, in many cases, taking their seat at the instrument), and as the organs of that day were tuned according to the *unequal* temperament;—as, moreover, the music was always written in the scales that were specially *favoured* by that temperament, but *out* of which, according to the above theory, they must uniformly have been transposed;—it follows,

if the above hypothesis be correct, that the learned composers referred to must have avoided using the *good* keys in performance, if not in writing, and preferred the *bad*. Now, it is not possible that proceedings so needlessly complex and objectionable as those just detailed could have been recognised, still less have received *preference*, at the hands of those who were, in all other respects relating to their art, such methodical and deep-thinking men.

Everything questioned exeept the presumed lowness of the old piteh.

738. In the attempted solutions hitherto advanced, the judgment of the great English composers of the time referred to, and even the original perfectness of some of nature's own work, the compass of the human voice, have been questioned, while one thing, the mutability of which is so well known, namely, the *pitch*, has been treated as though it was indisputably a very low one in the sixteenth century.

Strong grounds for believing in the former existence of a high eeclesiastieal pitch.

739. Now, although the opinion is directly at variance with all the hitherto received notions on the subject, there are the strongest reasons for believing that the ecclesiastical pitch of the sixteenth and early part of the seventeenth centuries, so far from being some two tones lower than that now in use, was *a whole tone higher than the present concert-pitch*.

The sixteenth and seventeenth eentury organs in Germany a whole tone sharp.

740. During recent visits to several of the organs of Germany, the writer was frequently struck with the extreme *sharpness* of the pitch of the *old* organs. Of the three great instruments at Hamburgh, two, namely, those in St. Catharine's Church, which is the oldest, and that in the church of St. Jacobi, built in the seventeenth century (see Foreign Organs in Appendix, Nos. 66 and 67), proved to be a *whole tone* above the writer's tuning-fork, marked "Philharmonic" pitch. The transept organ in St. Mary's Church, at Lübeck (No. 71), another *old* instrument, on being tested, was also found to be a whole tone above the same pitch; while that in one of the other churches in the same old town (No. 72) was a full semitone above the same pitch. On the enquiry being made of the organists of the three fore-mentioned churches, how they accounted for this circumstance, they explained that their organs were tuned to the *church* pitch; and it subsequently transpired that in Germany three distinct standards of pitch had at different periods been used to which to tune organs; namely, orchestra pitch, which was the lowest; chamber pitch, a semitone above the former; and church pitch, which was the highest. On extending these enquiries to an organ-builder of that country, that person stated that he had almost invariably found the old organs, which he had been called upon to tune, repair, or replace by new ones, a semitone or a whole tone sharper than the present concert pitch. Not the least interesting proof of the former existence of a high church pitch is to be found in the fact that Sebastian Bach, in his Church Cantatas, in most cases, wrote the *organ* part *a note lower than the other parts*;—which circumstance is alluded to by Mr. Macfarren, in his analysis of the contents of the first volume of Cantatas, published by the Leipzig Bach Society, printed in the *Musical World* for 1853.

A high ecclesiastical pitch believed to have existed formerly in England as well as in Germany.

741. The above facts, in conjunction with others, tended to confirm an opinion the writer had long previously entertained; namely, that in England, as in Germany, there must have existed, at the period of the Reformation, and from that time to that of the Rebellion, a church pitch quite separate from the orchestral or instrumental pitch; and not only so, but even higher than the modern concert pitch. Every circumstance directly supports this hypothesis, which at the same time removes and reconciles all the difficulties and improbabilities which have encumbered every other view of the same subject.

The very low notation of ancient church music favourable to this view.

742. To begin with a reference to the English Church Music. If we read the notation of the old Services *a tone higher*, the average compass of the treble parts will then be made to the extent from middle b or c^1, up to e^2 or f^2; and the bass parts, as a rule, not lower than gamut G or F F; precisely the ranges which are known to be the best for the corresponding voices in church music. By this very simple means the necessity is obviated; for, supposing that the range of the human voice has undergone any modification, it removes all occasion for suggesting that the whole race of church composers of the sixteenth and early part of the seventeenth centuries understood or studied the convenience of the voices so little as invariably to have written *too low* for them; and it renders it quite superfluous to suppose that that industrious class of writers made a practice of setting their services and anthems in *wrong keys*, leaving singers and organists to transpose them into the correct ones. William Turner, writing in 1724, says, "when Guido Aretinus reduced the Greek scale into the form now used, there was no sound practised *E la*, which gave birth to the common proverb, viz. he strains a note above E la," Without going back so far as this quotation would take us, if the pitch in Tallis's time had been some two tones lower than at present, it is difficult to comprehend a cause for treble voices having to "strain" at c^2; but if it were a tone higher, it is easy to understand that then, as now, the *sound* of f^2 sharp could only be produced by the exercise of some exertion.

The frequent transposition of early church music into higher keys, in performance, also in support of this view.

743. In addition to the theoretical evidences already advanced, there are many practical reasons for believing in the former existence of a church pitch in England higher than the present one. For some time past, it has been the custom with Mr. Turle, the organist of Westminster Abbey, to play Gibbons' Anthem, "Hosanna to the Son of David," which is printed in C, in D major; by which transposition the music is rendered more effective in performance, and far less laborious to the choir to sing. The writer also has for years made a practice of playing Gibbons' Service in G instead of F, and many other pieces a tone higher than they are printed, which experiments have uniformly been attended with so good an effect on the general character of the music, besides affording so much relief to the voices, as to strengthen the supposition that such transpositions were not departures from, but restorations of, the original pitch*. Again, the writer observed, at the

* All this goes to show the influence of "pitch," and the "compass of voices," on the effect of music, *irrespective* of temperament.

Bicentenary Festival of the Sons of the Clergy this year (1854), that Mr. Goss played Gibbons' Anthem, "God is gone up," in G, instead of F, as written, in consequence of the parts otherwise lying so low for the voices. The tenors descend to B, and in one case to gamut A. By the transposition they had not to go below tenor c or B; but if taken "some two tones lower," they ought to have descended to F F—a sufficiently low note even for *bass* voices now-a-days.

744. Another practical illustration that a high vocal pitch was most probably recognised by the early English church and choral writers, may be gathered from the custom observed at both the metropolitan Madrigal Societies, of almost uniformly taking the pitch of the old English madrigals a semitone or more higher than the notation represents, that is, in about the German chamber pitch of former times, to the great improvement of the general effect.

745. Since the above observations were first written, two interesting facts have come to the writer's knowledge, which strongly support the opinion as to a former high church pitch. In the library, at the Exeter Cathedral, is preserved a MS. copy, written about the beginning of the last century, of Tallis's Service in D, transposed into E; and in Dr. Rimbault's library is a copy of Gibbons' Service in F, transposed into G; in both cases the *notation*, no doubt, being *raised*, to compensate for the *lowering* of the *pitch*, in order that the originally intended *sounds* might be preserved.

746. In 1644, church organs were ordered to be demolished by act of Parliament; and so implicitly was the nonsensical decree obeyed, that very few organs escaped the general destruction; and even the two or three that were spared have subsequently undergone so much alteration in the course of improvement that they could afford little or no assistance in solving the question which has just been considered.

Father Smith's pitch flatter than the presumed ecclesiastical pitch of preceding times.

747. The organs built by Smith and Harris after the Restoration were not tuned to so high a pitch as the presumed choir pitch of the time of Tallis and Gibbons. Smith's pitch, however, was much higher than is commonly supposed, as may be gathered from the following passage, extracted from "The English Musical Gazette" for January 1819. "It is a remarkable circumstance that all Schmidt's organs were a quarter, and some even half a tone above pitch: this was so severely felt by the wind instruments, at the performances of the Sons of the Clergy, that they could not get near the pitch of the organ. In consequence of this, it was agreed upon, that the organ should be altered to concert pitch, by transposing the pipes, so that the present D D D was formerly C C C, and so on through the organ." To this it may be added, that the pipes to the C C C key are new ones; the two Open Diapason pipes, of wood, standing in the angles of the case to the left of the manuals. The pitch of the Temple organ was also originally very sharp; but was lowered in 1843. Yet neither the St. Paul's nor the Temple organ is even now more than a quarter of a tone below pitch; consequently they must both originally have been quite up to the *present* concert pitch, and therefore almost mathematically correct, if not quite so. Harris's organs were generally lower in pitch than Smith's. That at Wolverhampton,—part of the one that was originally erected at the Temple,

—was so until a few years since, when its pitch was raised. It is not certain what was the cause of this difference. Probably it arose from the fact of the French foot measure being greater than the German ; which measure, applied to the organ pipes, would necessarily lead to such a result as that just mentioned. It would be an interesting fact to discover positively whether the pitch of the organ stops was formerly regulated by the foot measurement of their longest pipes, or by the number of the vibrations of the column of air within them.

The flattened pitch accompanied by a raised notation.

748. But to turn from such speculations to the written music of the latter part of the seventeenth century. On referring to the sacred compositions by the contemporaries of Smith and Harris, we perceive this coincidence in support of the opinion that the pitch of that period was flatter than the earlier choir pitch; namely, that certain notes, such as e^2 and f^2, which scarcely ever appeared in the treble part of the earlier church music, were now of quite common occurrence.

The pitch lower again, at the commencement of the eighteenth century, in England.

749. Soon after the commencement of the eighteenth century, the pitch had again fallen. Possibly Harris's flatter pitch was preferred and accepted as the standard. It is known that the organ in the Chapel of Trinity College, Cambridge, commenced by Father Smith, and "cut down" and finished by his son-in-law, Schrider, in 1708, was originally adjusted to the pitch which has been shown mathematically to have been a minor tone below the present pitch. The writer of the "Reformation of Cathedral Music," page 25, says, "Dr. Smith (Harmonics, 1749) gives 393 as the number of vibrations of A in a second. Fisher, in 1823, gives 430. Woolhouse ascertained the Philharmonic pitch, in 1835, to have 424. The same note referred to the scale of vibrations C = 512, and derived as a prime harmonic from the subdominant F, will have 426·6. Now the ratio of any of these to 393 is almost exactly as 10 : 9, which is the ratio of a minor tone, showing the rise of pitch within a single century."

A similar alteration of pitch, at the same period, in France and Germany.

750. What is very remarkable is, the pitch had, soon after the commencement of the last century, fallen as much in France and Germany as in England. Of the three fine organs at Strasburg, built by Silbermann, those in the cathedral, finished in 1716, and that in the Protestant church, proved, on trial in 1853, to be *a whole tone below* the pitch of the same fork by which the Hamburg organs were tested the preceding year, and found to be *a whole tone sharp*. The third organ, in St. Thomas's Church, is nearly as flat. The organ in the church of St. Maria di Capitol, at Cologne, built in 1767 by Konig, was also originally flat; and, like the Trinity organ, has since been sharpened.

The lower pitch in the last century accompanied by a further ascent in the notation.

751. In this case, again, the greater *depression* of the *pitch* is manifested by the increased *upward* range of the *notation*, as is clearly demonstrated by the music of Handel and other composers of the last century, even without the authority

of Handel's tuning-fork, the existence of which further authenticates the supposition. William Turner likewise speaks of the treble voices in his time going some three or four degrees higher than Guido's gamut, which, however, would then have consisted of the same range of *sounds* as in Tallis's time, or within a semitone of it*.

752. It is evident, then, (1) that the organ pitch has within three centuries varied to the extent of two whole tones; (2) that there have at different times existed three distinct pitches, the highest being the oldest; that in use soon after the commencement of the last century being the lowest; and (3) that the present pitch is about midway between the extreme high and low pitches of former times, and is as nearly as possible identical with Father Smith's.

To which of the three church pitches formerly in use should a church organ be tuned?

753. The question now is, to which of these three different pitches a *church* organ had better be tuned, seeing that music has been written to *all* of them, yet but *one* can be adopted? As the *medium* pitch is at the same time also the true mathematical one, there can be no doubt but that, theoretically speaking, it would be better that all organs be adjusted to a fork that gives that true mathematical pitch, such as that published by Mr. Hullah, and issued by Mr. Parker, of No. 445, West Strand; but complaints are so frequently made by members of congregations on the one hand, and by singers who have to perform the solo and verse music of the last century on the other, of the inconvenience of singing to the present high pitch, that it is worthy consideration whether it would not be as well to have organs tuned exactly a semitone flat, for the general convenience of the voices, and then for such music to be transposed as may require it, and into such keys as would best suit the particular congregations or choirs. At any rate, it is clear that, to be adequate to the purposes of transposition, all organs should be tuned on the equal temperament system. In that case, music could be transposed by easy semitonal gradations, either upwards or downwards, or by whole tones, without involving crude results, which could not be accomplished on an organ tuned in any other way.

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* It is, perhaps, worth mentioning, that several pieces by Handel have lately been transposed into *lower* keys, and printed with the view of *restoring* their original pitch.

DIVISION VII.

CHAPTER XXVIII.

ON THE CORRECT USE OF THE STOPS.

754. HAVING, in a preceding chapter (see *ante*, page 112), given an account of the several organ Stops commonly found in English organs, a few words may now be added as to their object and use, as well as their effect when sounded singly or in combination.

755. On a correct knowledge of the nature, quality, and pitch,—whether indicated by name or by figures,—of the different organ Stops, depends the good or bad effect of even the best organs. Without a clear perception of what is right in these matters, it is impossible that a performer can be *sure*, how, under what circumstances, and for what ends, this or that combination of Stops may be the most seasonably employed. However scientifically the organ-builder may have fixed and deduced his scales, voiced his pipes, and truly balanced their tone; however strictly every rule necessary to the production of a "good organ" may have been observed in constructing the instrument; all these important preliminaries necessary towards a becoming and decent accompaniment to the music of the church will be of little avail, if the mind that is to direct their use is but imperfectly stored with the knowledge necessary to secure their proper application. Nor can this knowledge be obtained from books, beyond a certain extent; for a combination of Stops that will answer a particular purpose in one organ, often will not do so, at any rate to the same extent, in another, on account of the different size or proportions of the building in which the organ stands; the varied strength of tone of the similar Stops of different instruments; the situation of the organ in the church; or even the locality of the Stops in the organ itself, for the exigencies arising from which circumstances, or a combination of them, no book could provide. It is, therefore, incumbent on every organist rather to endeavour to ascertain for himself the peculiar excellencies, and perhaps defects, of the individual instrument at which he is chosen to preside, and so discover the method of applying the former to special purposes with the best effect, and of hiding the latter as far as may be.

756. There are certain general and fundamental rules, however, concerning the appropriate method of combining the Stops, which may be pointed out. Besides the

combinations about to be specified, others of a less common kind will be found to follow the suggestions for the introduction of certain Stops in the specifications given in a subsequent chapter; beyond which, as has been already said, all must be left to the organist's good judgment, and the capacity of his instrument.

General rules for the use of the Stops.

757. The first step essential towards a correct knowledge of the right use of the Stops, is an acquaintance with the general method of combining the members of the three great classes of Foundation, Mutation, and Compound-stops, so as to secure, in all cases, the predominance of the foundation tone.

758. The Foundation-stops, as explained in a preceding chapter (see *ante*, page 110), produce a sound agreeing in name with the key pressed down; and are of 16, 8, 4, and 2 feet on the Manual, and of double size on the Pedal.

759. The larger Foundation-stops will, for certain purposes, produce an appropriate effect alone; as, for instance, the 8 and 4 feet Flue-stops, or the 16, 8, and 4; or in some cases the 16, 8, 4, and 2 feet, though the latter combination will necessarily be somewhat thin and transparent.

760. The Mutation-stops, i. e. the Fifth, Tenth, Twelfth, Tierce, Larigot, &c. are not intended to be used alone; the class to which they belong being designed expressly for the filling up of some of the intervals between the Foundation-stops; and for so doing away with the leanness of bare octave-work. They depend on the first class of Stops for their good effect, and must not therefore be employed without them. In using the Mutation-stops, care should be taken that the Foundation rank, the next smallest in size, is also drawn with it to cover it; otherwise, its sound will appear too remarkable, and perhaps even offensive. Thus the Twelfth should always have the Fifteenth drawn with it; and the Tierce or Larigot, the octave Fifteenth, at any rate in the bass.

761. The Fifth and Tenth, being *Double* Mutation-stops, forming the Twelfth and Tierce to the Double Open Diapason, constitute no part of the *Unison* harmonic series; for which reason they should never be drawn without their Fundamental-stop of 16 feet. An exception to this rule is sometimes made abroad, with good effect, on the pedal; concerning which, more farther on.

762. The Compound-stops can only be successfully used when blended with some Foundation and Mutation-stops.

763. The Foundation-stops give distinctness, the Mutation-stops fulness, and the Compound-stops brightness and point to the general organ tone.

The character of tone of some of the leading Stops; and the purposes to which they may be applied.

764. The Unison-stops are, of course, the most important in an organ, as they are also generally the most numerous. In drawing any of these separately, or blending them together, attention should be directed to their various qualities of tone. Some Stops possess a character that renders them more applicable to one kind of music than to another; and, again, some mix better than others together.

765. *Open Diapason.* The tone of this Stop is full, sonorous, and solemn. It is the one the best adapted for the performance of slow music in dispersed harmony, particularly when there are many suspensions occurring in the progress of the piece.

The Stopped Diapason is advantageously added to the Open Diapason, when used as above, to give body to the pure sounds of the open pipes; and the Dulciana, if there be one on the same Clavier, is also drawn, as adding slightly to the general effect. All reedy-toned Flue-stops, as the Gamba, &c. are foreign to the purpose, as interfering with the smooth and *velvety* tone of the best English Diapasons.

766. *The Stopped Diapason* is delicate and flutey in its character of tone. Generally speaking, it tells better, when used singly, for solo purposes than for full harmony; its tone being too weak and not sufficiently sonorous for the latter purpose. In short passages of tranquil character, however, it can be used with good effect. As a Combination-stop, it is one of the most useful in an organ. It is the best one to use with the Clarionet, with the tone of which it blends admirably; or with the Swell Hautboy, when the latter is to be employed as a Solo-stop. In certain cases it forms an excellent accompaniment to a single voice, being very prompt in its speech, as well as light and travelling in its tone.

767. *The Dulciana* is usually a Stop of great delicacy, smoothness, and gentleness of tone. Its sound is lighter than that of the Stopped Diapason, but clearer and of a more singing character. It is the most used singly as an accompanimental Stop to some of the Solo-stops on the other Manuals, as the Stopped Diapason in the Great Organ, or the Hautboy in the Swell; its own situation being usually on the Choir Manual. The Dulciana may, however, be effectively employed as a Solo-stop, in the treble part, in cantabile passages, with the Diapasons in the Swell (closed) by way of accompaniment, and also much in the same way as the Open Diapason, i. e. in full harmony, to which Stop it may be considered as a diminutive or echo.

768. *The Gamba,* from the resemblance of its tone to that of stringed instruments, is peculiarly well adapted for four-part playing, particularly for music that has many chromatic progressions in the harmony. When of weak intonation, it tells best by itself; but when of strong tone, it sounds better when blended with the Stopped Diapason, Clarabella, or German Hohl-flöte. For accompanimental purposes it requires to be used with some caution. A Gamba of strong intonation, used alternately with the Stopped Diapason and Stopped Flute (one of them of metal) on another Manual, produces a most charming effect. The pungent tone of the former, followed by the liquid tones of the latter combination, present a most exquisite contrast. What has been said of the Gamba, applies mostly also to the Keraulophon and other reedy-toned Unison Flue-stops.

769. *The Clarabella,* from its powerful flutey quality, forms an excellent Unison Solo Stop by itself, at times when a strong and decided flute tone is required. As a Combination Stop, for use with the Clarinet or Hautboy, it sometimes imparts too much body to render the imitation close.

770. *The Trumpet* in the Great Organ is seldom used as a Solo-stop. When it is so, it should always be accompanied by the Diapasons. When thus blended, it sounds well, if played in harmony; in major keys, its effect being grand and dignified; and in minor, solemn and impressive. Diatonic progressions of harmony are better suited to the tone-character of this Stop than chromatic. The Swell Trumpet is much used for choral accompaniment, as well as for solo-playing; and the same may be said of all the other full Scale Unison Reed-stops of that de-

partment. When employed for the former purpose, it has the Diapasons drawn with it; and often, also, the Principal and smaller Stops, according to circumstances. As a rule, all Reed-stops should have some Unison Flue-stop, or Stops, combined with them, to add body to the penetrative and powerful character of that produced by the Reeds.

771. *Clarionet.* The best Flue-stop to draw with the Clarionet is the Stopped Diapason; as this not only mixes well with the former, but does not give more body and thickness to the tone of the Stop than it should have in its imitative capacity, and it is not generally used in any other. This Stop is often used, among other purposes, for playing out the whole or a portion of the melody of a Psalm Tune upon. For an accompaniment thereto the Swell Diapasons and Hautboy answers well, with a couple of soft Stops (16 and 8 feet pitch) for a Pedal Bass.

772. *The Hautboy,* as already intimated, when about to be used as a Solo-stop, will tell best with the Stopped Diapason only added. The instrument itself (Hautboy) is by nature but of thin tone; hence, to preserve the resemblance between the tone of the original and the prototype, a Flue-stop of light but firm tone is the most appropriate to be employed. When used for the purpose of accompaniment to voices, the Hautboy Stop tells best combined with both the Diapasons, and perhaps also, though not always, with the Principal; which latter Stop will sometimes blend and sometimes not, according to the exact character of the Reed-stop.

.773 In blending together some of the smaller Foundation Stops with the Unison, for the purpose of accompaniment, they are generally taken in their regular octave progression. Thus, after the 8-feet Stops are drawn, some of those of 4-feet are next brought on; and then, if necessary, those of 2-feet; but not those of 2-feet first, and then others of 4-feet. The Flute or Principal, or both, according to the strength of the unison tone, therefore follow the Unison Stops; and then the Piccolo or the Fifteenth, if necessary; and not *vice versâ.* For particular effects, unusual combinations are made; as, for instance, 16 and 4 feet Stops without any of 8; or 8 and 2 feet Stops, omitting those of 4 feet. Such combinations produce the best effect when compounded of members of the covered or light-toned Flute-work. The tone of Stops of the Open Diapason species is generally too strong and sonorous for such purposes.

On the combination of the Stops for the production of any required strength of tone.

774. By means of an appropriate combination of the Stops which all well-arranged or complete organs contain, any strength of organ-tone may be obtained, from the softest to the loudest. The kinds of Stop arrangement that will produce these several desirable and necessary gradations of sound, may be distinguished by a particular letter or letters, thus: PP, P, MP, MF, F, and FF; under which heads may be conveniently given such combinations as will produce the strength of tone that the musical meaning of those letters are understood to indicate.

775. PP. For the production of a *Pianissimo,* a single soft-toned 8-feet Flue-stop* on the Manual will be sufficient as a Stopped Diapason, Dulciana, or Gamba,

* The size of Stop here spoken of may or may not be its standard size. "When, in organ music, "8-feet Flue Stops" are directed to be used, the expression is understood to mean the combination of all Stops, except the Reeds, that give the 8-feet sound. This interpretation is always accepted when speaking of the *use* of the Stop.

&c. On the Pedal, its own Bass (16 feet) may be drawn, or, if that is not present, some other Stop of an equally subdued tone. It is generally of advantage to add a "helper" (that is, a Stop giving the octave above), to the Pedal: this can either be a soft Pedal Stop of 8 feet, or the Manual Stop coupled to the original Pedal Stop.

776. P. for *Piano*, all the smooth-toned Manual 8-feet Flue-stops. On the Pedal, the corresponding 16-feet Stops should be drawn. The addition of an 8-feet Open Stop will in many cases improve the effect of the Pedal; but, if a Stop of this kind should not exist in that department, one of a similar nature can be borrowed from the second Manual; or the first Manual may be coupled to the Pedal.

777. M.P. a *Mezzo Piano* is gained by adding the 4-feet Flue-stops of the Manual (Principal, Flute, &c.) to those already named; and those of 8 feet to the Pedal.

778. For the production of a medium strength of tone between the two last-given gradations, combine all the *soft* 8 and 4 feet Manual Stops, as the Stopped Diapason, Dulciana, and Flute. These, together, possess more brightness, but less fulness than the former, and less roundness than the latter.

779. M.F. A *Mezzo Forte* is produced by adding the $2\frac{2}{3}$-feet and 2-feet Stops (Twelfth, Fifteenth, &c.) on the Manual, to those of 8 and 4 feet, and those of $5\frac{1}{3}$ and 4 feet to the Pedal.

780. F. For a *Forte*, the collected Compound-stops may be brought into play. When a medium between the two last-mentioned gradations is required, only one Compound-stop need be drawn.

781. FF. A full climax is secured by adding the Reed-stops (Trumpet, Clarion, &c.) to the foregoing.

782. A medium may here again be obtained by adding the 8-feet Reed-stop only to the Flue-stop, previously drawn out.

783. The Manual 16-feet Flue-stops (*Doubles*) have not been specified in any of the above gradations, because it is not so much the nature of such Stops to add power as weight, gravity, and solemnity, to the tone of the other Stops. Their use with or rejection from any particular combination, therefore, does not so properly come under consideration, when the question of *strength* of tone is being discussed, as when that of *character* of tone is being treated of. Almost any combination, whether loud or soft, may receive the accession of a 16-feet Stop with advantage, under particular circumstances. Thus, some soft or moderately strong combinations that would perhaps give a tone approaching towards joyfulness, becomes imbued with a more serious character, when a Stop of 16-feet pitch is added thereto, and is therefore rendered a more fit accompaniment to music of a sad character. A strong combination which possesses the brilliance and point of the Mixture-work, and perhaps also the impressiveness of the Reed-stops, acquires weight and magnificence from 16-feet Manual Stops, particularly if they are accompanied by Double Mutation Stops and a 16-feet Reed-stop.

784. Moreover, the organ should be used in a somewhat different manner when any 16-feet Manual-stops are drawn, otherwise the excellent effects which that class of Stops are especially calculated to produce, will be to some extent obscured. The omission of all "Doubles," as a rule, from the Manuals of English

organs, until of late years, rendered it compulsory on organists to invent a sort of substitute for them *in effect;* for it was found that the organ-tone lacked the requisite gravity and dignity, however numerous the *Unison* Stops might be. Performers on that instrument, therefore, had to lay aside the purer and more strict style of playing, as being "ineffective," and to fall back upon the system of keeping some eight or nine notes down at a time, to draw from their instruments anything approaching a broad and massive character of tone. Latterly, the serious omission above adverted to has been supplied, by addition to old organs, and by incorporation with new ones; and the care already hinted at, as being required in playing on an instrument possessing so valuable an acquisition, consists in not adopting so full a style of playing, when the 16-feet Stops are drawn, as when they are not. The former is viewed as rather a complicated *substitute* for the latter; and if *both* are had recourse to simultaneously, the one is most likely to destroy the effect of the other. A very charming contrast may, however, frequently be produced by accompanying a Chant or Corale, sometimes in four parts *with* the Doubles drawn, sometimes in about six *without* them.

785. It may be mentioned here, that many object to the Doubles being used in accompanying Fugal compositions, particularly at those points where the subject is led off by one of the higher parts. There is much reason in this objection, although it only applies to the precise times specified. The Doubles may, between whiles, be introduced with even greater effect, when the voices are moving in harmonic masses. For the best illustrations of the occasions when the 16-feet Stops may or may not be used in choral accompaniment, the organ part to Israel in Egypt, written by Mendelssohn for the Handel Society, may be consulted with the greatest advantage.

786. When the organ is being used as a *solo* instrument, i. e. in voluntaries, the above objection does not hold good. The Doubles cannot then interfere with or mislead any voices. Moreover, the tradition general throughout Germany, is, that Sebastian Bach played his Fugues with the Doubles drawn; therefore, those who would aspire to perform his works after his own manner, can only do so by availing themselves of that dignified class of Stops. As to "the octave below" being discernible at the starting of a Fugue, there is no doubt that any moderately educated musical ear can detect any interval or Stop in an organ that it cares to listen for, whether it be the Double Diapason, the Tierce, the Twelfth, or what not; but that affords no conclusive ground for the exclusion of any of those Stops. Besides, even supposing the Doubles to have an undesirable effect for some half dozen bars in the course of a musical composition, if it has a most advantageous influence in the remaining hundred or so, which fact is beyond question, the far greater evil would arise from their *exclusion*.

787. Neither has the influence of the *Swell* been included in the foregoing scheme for producing various degrees of strong or weak tone. The Swell is of inestimable advantage for all classes of accompaniment, as it enables the performer to increase the tone when the voices may be getting flat, and to decrease it when all is going well. This power is independent of and supplementary to that of imparting expression to the music, which latter attribute is of such peculiar value, as well as being highly acceptable to those who have true appreciation and sound musical feeling.

On the adaptation of the organ-tone to the true purposes of choral accompaniment

788. In applying the various combinations and resources already specified to the purposes of choral or congregational accompaniment, there are many circumstances to be taken into consideration, and which ought always to influence the selection. The first and greatest of these is of course the prevailing character of the words about to be sung, whether they are jubilant or supplicatory, and with which the accompaniment should always accord, so that it may produce a suitable impression. A musical composer, when scoring a secular work for an orchestra, employs those instruments, the quality and character of tone of which are the most applicable to the subject of the words and the spirit of the music. An organ being the more seemly substitute for an orchestra in a Church, and containing, as it does, imitations of most of the orchestral instruments, an organist should, by a skilful combination of its different Stops, adapt the tone of the instrument to the sense of the words and the character of the music that are being sung, in order that the result of his rightly-directed efforts may be as appropriate and acceptable as possible. When it is recollected how much pains is taken with the accompaniment to heighten the effect of music, some of which is avowedly written chiefly for man's amusement and pastime, it is obvious that at least the same amount of care should be exercised to secure an equally appropriate accompaniment to those vocal strains which occur in the edifying Services of the Church. An organist cannot be too mindful of this, nor can he exercise too much forethought and discretion in making this most important condition of the utility of his office legitimately perceptible. It is in this particular, of all others, that he has the opportunity of showing his superiority over the mechanical work of a self-acting instrument. A barrel-organ can be made to execute music with the utmost precision and finish; it may even be made to shift its own Stops; but it cannot be endowed with the *reason* necessary wherewith to direct the *application* of these combinations to their special purposes. A *mind* must be in active operation to do this worthily; and herein lies the secret of an organist's great advantage in performance, over an instrument from which the Choral accompaniment is "ground" out. Nothing can be less acceptable than to hear bright Stops used, and an animated style of playing adopted, when the words are prayerful or supplicatory; or, on the other hand, to hear only heavy Stops brought into requisition when the subject is a jubilant one. Every large and well-designed organ necessarily contains many Stops that are appropriate and inappropriate for *all* occasions; and it is, therefore, capable of considerably heightening or of injuring the effect, according to whether its powers be rightly directed or not: and an organist who misses their judicious application, whether from causes resting with himself, or from the influence of others, is open to the supposition of being disregardful of the trust reposed in him, and may, therefore, hazard the respect due to his office—consequences against which every organist should guard himself by the exercise of his best powers of discrimination.

789. After ascertaining the prevailing character of the words, the next point to be considered is the exact *quantity*, as well as description, of loud or soft tone that the circumstances of time and place would seem to suggest as the most appropriate to the occasion. As the number of the congregation will vary very considerably on different occasions, so also will the strength of the united voices of its members. The amount of organ-tone, therefore, necessary for directing and giving support

to the voices of a full congregation, will consequently be too much when there is but a "thin attendance." Particular care, therefore, should be taken to modify the tone in some way, so that it may not be too strong for a reduced number of voices, and yet strong enough to prevent the congregation singing out of tune or time. The simplest way of lessening the strength of the accompaniment without destroying its spirit and character, is to draw, on the Second or Third Manual, Stops of the same size, and perhaps name, that one would use on the First, if the concourse of persons were larger. Any modification in this combination that the peculiarities of the particular organ might render necessary, would of course be taken into account. With the resources at his command, which every Parish Church organ ought to possess, and which many do, an organist ought to find no difficulty in accommodating its tone to any exigency that may arise.

790. At the same time that every organist should view his calling as a high one, demanding the exercise of great intelligence as well as technical knowledge in the fulfilment of its duties, it should also be borne in mind that the introduction of organs into churches, and their judicious employment there, are but means to the attainment of certain ends. What those ends and objects may be, will be best gathered from the following quotation from the introduction to Schneider's School for the Organ, which well describes what is looked for from the Church organs and organists of Germany. "An organ consecrated to the sanctuary and to sacred music, is intended to be subservient to the edification of a congregation assembled together for divine worship; to support and to accompany, in a proper manner, the singing; and to be instrumental in promoting a devotional frame of mind and the edification of the soul, and its elevation above every thing earthly, to the contemplation of things invisible and divine—a noble object, which can only be obtained by a style of performance suited to the holiness of the place and the sacredness of the subjects. The proper management of this sublime instrument can induce a devotional spirit and an elevation of mind in the scientific hearer, as well as in any individual of feeling. The sound of the organ is able to insinuate itself by mild and tender tones, and then the mind is filled with the pious tranquillity of filial devotion; but it can also elevate itself to majesty and pomp, and peal and roll like storm and thunder, and then it elevates our hearts with sublime emotions. Whilst most other instruments can only express individual feelings, this kingly instrument can produce a variety of emotions The organ alone can best fill with its tones the lofty vaults of the vast Cathedral, support the singing of large congregations, and, by its power, operate upon the religious feelings."

DIVISION VIII.

THE CAUSE OF MANY OF THE FAULTS WHICH ARISE IN AN ORGAN, TOGETHER WITH THEIR REMEDIES.

CHAPTER XXIX.

791. It is important that an organist should be in a position to ascertain the cause of the faults existing, or occasionally appearing, in his organ; and also what are the steps necessary to be taken to remedy them. Some derangements arise from such simple causes, and can be so easily set right, that an organist might remove them himself, if quite certain of the seat of the disorder; and, by so doing, save the organ-tuner perhaps a long journey to rectify what may not occupy him ten minutes when he is there. Schneider, in his "*Organ School*" (page 60, first English edition), expresses himself on the above subject in the following words: "It is, generally speaking, necessary for the organ-player that he should make himself as intimately acquainted as possible with the internal construction of the organ, with the nature of every single part, the combination of which constitutes its whole; as well of the particular parts of the mechanism which cause the pipes to sound, as also of the nature, peculiarities, and properties of the pipes themselves, in the manifold variety of their make, and the various kinds of sounds which are constantly produced; by which means alone, a right and appropriate style of managing the instrument, and one in all respects suitable to its nature, can be attained. But, as regards a regularly appointed organist, the knowledge is absolutely indispensable; for it is his first duty to take care of his instrument, to preserve it and carefully to look after it—a duty which can only be fulfilled when he is able to discover immediately the cause of those derangements in the mechanism, &c. which are unavoidable in an instrument composed of so many diversified parts; and even to remedy, himself, the defects in many cases, when an organ-builder may not be immediately at hand. If the organist, thus acquainted with the construction of the organ, fulfils that duty to the fullest extent, and, in those cases for which he does not find himself competent, procures promptly the assistance of some qualified person, an organ may continue for a long time in a sound condition, and a more extensive repair be rendered unnecessary for a considerable period. On the contrary, an ignorance of the construction of the organ, and negligence in the care of the instrument, and also with respect to getting small defects

remedied, always leads to inevitable and more considerable damage; and not only do expensive repairs become requisite, but also an instrument thus neglected can often only be restored in a very imperfect manner."

THE UNBIDDEN SOUNDING OF A PIPE FROM CAUSES IN THE REGION OF THE PALLETS.

Ciphering caused by dirt on the pallet.

792. Among the numerous faults and derangements to which all organs are at times liable, one of the most frequently recurring is that known as a "ciphering;" in other words, the sounding of a pipe, on the drawing of a Stop, without any key being pressed down. A ciphering may arise from various causes. Some grit or chips may have worked down from the pipes, through the table and the channels of the sound-board, to the surface of the pallet; and, by resting on its edge, and holding it a little way open, thereby admit sufficient wind into the groove to make the first Stop sound that is afterwards drawn. A derangement from this cause is frequently indicated by the controlling key being a little below the level of the others. To remedy it, the front-board of the wind-chest must be taken off, the pallet drawn open, and its surface carefully wiped, as well as that part of the groove against which it "beds," with some dry, rough substance, to remove the impediment.

793. To facilitate the rectification of such casualties, some German organ-builders fasten on the front-board with large wooden screws, having sexagon heads, so large that they can be turned by the fingers alone; so that, in the event of a pallet becoming deranged during the service, the organist can get at it, with little loss of time, without the aid of noisy tools, and perhaps put it to rights before the organ is again required.

Ciphering from a pallet-spring being too weak.

794. Or the ciphering may be caused by the pallet-spring being too weak to cause the key-movement to return quickly, and the pallet to thoroughly close over the pallet-hole. If this is the cause, the key will rise sluggishly, and only partially; and the ciphering will continue till the key has been raised to its proper level by the hand. In this case, a piece of coiled wire, similar to that on the fourth string of a violin, and called by organ-builders "check-spring," may be fastened to the tracker, outside the wind-chest, and to some neighbouring wood-work, which will assist the return of the movement, and accelerate the closing of the pallet. Or, still better, the weak spring can be removed and replaced by a stronger one.

Ciphering caused by the pallet catching on a direction-pin.

795. Sometimes a ciphering will be caused by the pallet descending too low, and catching on one of the side direction-pins; an accident that is likely to occur, if a key be struck too violently and suddenly. To cure this, the front-board must be taken off, and the pallet released. In some German organs, the two side direction-pins are omitted, and one pin introduced instead, of extra stoutness, placed in the centre of the front of the pallet, where a small vertical groove is cut in the pallet, to allow the pallet to descend and ascend without leaving the pin.

Ciphering from damp loosening the leather; or heat warping the pallet.

796. A ciphering will frequently arise—particularly in instruments that are so situated as to be exposed to the changes of atmosphere in an aggravated form—from the damp in winter loosening the leather from the surface of the pallet, allowing it to swerve from its place over the pallet-hole, and admitting wind into the groove; or from the heat in summer warping the pallet as it dries it, and, by destroying its evenness of surface, preventing its bedding properly over the pallet-hole. To remedy either of these derangements, the pallet has to be taken out; and, in the one case, the leather has to be fresh glued on to the pallet; while, in the other, the pallet has to be planed down afresh, newly faced with leather, and then re-fastened to the sound-board.

797. The pallets in some French sound-boards are made without leather pallet-hinges, but with simply a pin passing through a puncture in the tail end of the pallet, for the pallet to work upon. This arrangement presents the advantage of allowing an almost instantaneous substitution of a sound pallet for a defective one; and it also admits of the immediate resumption of the use of that pallet, instead of its remaining idle for many hours while the glue is drying. It also admits of the easy cleaning of the joint-end of the pallet, which is always a tiresome operation with pallets fastened on in the usual way.

Ciphering caused by a pull-down being rusty.

798. A ciphering is sometimes caused by a pull-down having become rusty, which causes it to become fixed in the hole in the brass plate through which it ought to pass, and holding the pallet a little way open. This fault can generally be remedied by drawing the pallet open, and cleaning the pull-down with scouring paper; care at the same time being taken not to bend the wire, which would establish another source of ciphering.

THE UNBIDDEN SOUNDING OF A PIPE FROM FAULTS IN THE KEY-MOVEMENT.

Ciphering from some adhesive substance falling between the keys.

799. A ciphering will sometimes be caused by some derangement of the key movement. Commencing at the keys, one of the commonest causes of ciphering is the falling of melted wax or tallow on and between the keys, which will attach two together. This is soon remedied by carefully scraping the sides as well as the surface of the keys with a penknife, to remove the cause of adhesion. Or it may be caused by dirt, or a pin having fallen between two keys. The best way to proceed to remove the impediment, in that case, is to "work it out," which may be effected by taking hold of the two keys, in front, with the thumb and forefinger of each hand, and raising the one key at the same time that the other is lowered; drawing them apart with a certain amount of firmness, without violence, to encourage the impediment to fall.

Ciphering caused by a key warping.

800. Another cause of a sticking at the key, is its warping from excessive heat, which causes it to rub against its

neighbour, and become fixed. The eye will easily discover whereabouts the key is out of the parallel, if it is in the fore part of the key; as well as the probable point of contact. To remedy this, the key has to be removed from its place, and either scraped, or a few very fine chips pared off from the part where it touches the next key; which may be done sufficiently to ease the key, without disfiguring it. To remove the key, the book-desk has first to be taken out; and if the disarranged key is in one of the lower sets, the upper must be lifted out, to lay the right Manual bare. Modern organs are usually so constructed that the Manuals can be moved in or out with little more difficulty than the drawers of a chest of drawers, which is a most convenient arrangement.

Ciphering from a sticker binding.

801. Sometimes a sticker will "bind" in the hole in the register through which it should move, from damp swelling both portions of the wood-work, whereby the hole in the register becomes smaller, and the sticker larger. This can be cured by taking out the sticker, and either filing the hole in the register a little larger, or by scraping the sticker. Or the sticker may bind, from the black-lead having worn away from its surface; in which case, more might be added with a black-lead pencil, without, however, damping it.

Ciphering caused by a backfall getting off the sticker.

802. In a backfall movement, a ciphering will sometimes be caused by the backfall shooting off the sticker, under the influence of a violent blow on the key, and catching on the top of the sticker-pin. To set this right, it is simply necessary to press the sticker-pin carefully, but firmly—without, however, bending it—into its place under the drill-hole in the backfall, and lowering the backfall into its right place. On doing this, the key will resume its proper level.

Ciphering from grit in the centre-holes; or by a swelling of the movement.

803. A ciphering will sometimes be caused by grit, dirt, or small wood or metal chips working into the pin-holes of some part of the movement, or between a square or backfall and the frame; which, by preventing the complete action of the movement, will hold the pallet a little way open, and also cause the key to remain a little way down. By tapping the key rapidly, the fault will frequently correct itself, and save further trouble: if not, it must be sought for through the movement, and removed. Or some part of the movement may have swollen, and be thus made to bind too tightly on the pin. This might be rectified by cutting the centre-hole the least degree larger; but if the fault only appears in damp weather, and then only slightly, it is usually better to leave it to be corrected by a drier and warmer atmosphere; particularly as the wood, by contraction at such a time, might otherwise leave the pin-hole sufficiently large to cause a looseness of action, and a rattling.

THE UNBIDDEN SOUNDING OF A PIPE FROM DEFECTS IN THE SOUND-BOARD.

804. A running. One of the most tiresome and vexatious defects which can occur in an organ is a *running;* because the region of the disarrangement is fre-

quently one of the most hidden parts of the organ. Its seat is always the sound-board, or immediately adjacent parts, and it consists of an unbidden sounding of a second pipe on the sounding of a first, which may arise from a variety of causes. The pitch of the second sound, however, will sometimes assist one in discovering the seat of the disorder, if some allowance be made for its pitch being *flat*, and its sound not well defined, on account of the defect frequently being produced by a very small quantity of wind, which *breathes* rather than *blows* into the pipe. For this reason, the evil is not apparent when all the Stops on the sound-board are drawn; for then there are so many outlets for the fugitive wind, that it disperses and escapes without producing any audible effect: but when one or two soft Stops only are drawn, then it frequently becomes painfully so.

A running caused by an upper-board being too loose.

805. A running may arise from an upper-board not being screwed down sufficiently; which is soon remedied by tightening the screws in the immediate vicinity of the pipe originally sounded. Or it may be caused by a leakage from one groove to the next. Whether it arises in this manner, will be indicated by the pitch of the unbidden sound, when compared with the plantation of the pipes. If the pipes are planted semitonally, as in plan 2, *ante*, page 42, and the secondary sound is the half tone above or below the tone sounded; or if the pipes are disposed tonally, as in plans 1 and 3, *ante*, pages 41 and 42, and the unbidden sound is a tone above or below that produced in the usual way; the defect will, in either case, be traceable to the above-mentioned cause.

A running caused by a sound-board bar separating from the table; or by an unsound bar.

806. Or a sound-board bar has "sprung," i. e. has become partially separated from the table; or a small crack has "started" in the sound-board bar itself, allowing a little wind to pass through from one groove into the next. To stop this, the crevice is well covered with paper, coated and saturated with glue. Sometimes, to cure this fault, recourse is had to "bleeding" (see *ante*, page 34, sec. 145); which, however, is only an objectionable method of hiding the fault.

A humming caused by one slider touching and partly drawing a second.

807. A disagreeable humming, not unlike a running in effect, although it is not in reality one, will sometimes be caused by one slider rubbing against the next as it is being drawn, and partially drawing that also, causing a little wind to pass into the pipes of a second Stop. In this case, the effect will be like a running of an aggravated kind, inasmuch as the defect will appear to exist on nearly every key of the manual. The unbidden sounds will be rather lower in pitch than the correct sounds, though scarcely amounting to a semitone. To remedy this evil, a peg might be driven in between the two sliders; or one of them might be planed at the edge to prevent its touching the other. As the objectionable custom of placing two, or even as many as three sliders together, without intermediate bearers, is entirely discarded by all modern organ-builders, the liability of a humming from the disarrangement last named is confined to old organs. When it occurs, all the Stops that are not actually in use should be pressed in.

A humming caused by pipes standing in too close proximity.

808. Sometimes the unbidden sounding of a second pipe will arise from the pipes being packed too closely together, so that the wind that passes out at the mouth of one pipe enters that of another, causing it to produce a moaning sound. This evil frequently is not an easy one to remove. The primary cause of this is the sound-board being too small, which leads to the pipes being placed in too close proximity. In some cases, this defect can in a manner be cured by turning the mouth of one of the pipes in another direction; or by mounting the pipe on a longer foot; or by conveyancing it off to another situation. The most thorough cure for such an evil, however, is the introduction of a new and larger sound-board.

DEFECTS IN THE KEY-MOVEMENT.

A springing in the key-movement.

809. A Manual key will sometimes go down about half-way, under the pressure of the finger, without causing any sound; after which, something will appear suddenly to snap, and the key will descend the remainder of the distance with a run, the organ at the same moment sounding. This disagreeable effect is caused by the roller being too weak. Instead of its setting the second arm in motion the instant the first one is operated upon by the key, the roller "springs" or twists for a time, until it has in this manner derived a sufficient accession of power to give a tug at the pallet; the resistance at which being thus overcome, the pallet starts down, giving to the touch the tiresome breaking sensation already noticed. This can only be cured by introducing stronger or thicker rollers.

A dead resistance opposed to the finger by the key-movement.

810. In some cases, a key will at first altogether resist the touch of the finger, and will not move until the pressure has been much increased, when it will suddenly give way, and descend, accompanied by a sharp clacking noise. This defect, quite as annoying as the last, is found more frequently in old organs than in new, where the roller-arms are of iron, instead of wood, with metal tracker-hooks attached in both cases. The iron, after a few years, rusts, causing a grating and biting, instead of a free and immediate action, which leads to the dogged resistance experienced at the keys. New wooden roller-arms are the only cure for this fault.

A thumping at the keys.

811. A thumping will sometimes be heard as the keys go down. This will be the case, if the layers of cloth or baize under the front of the keys have become hard, or are too thin. The fault is easily remedied by the substitution of soft and thick baize, or by the addition of an extra layer.

A rattling in the key-movement, from the noisy nature of the materials.

812. The original key-movements of old organs were frequently so noisy, rattling, and squeaking, and their every motion so audible, that whatever the organist played seemed to have the questionable addition of a "castanet" accompaniment. This offensive

interruption arose from metal having been used where wood has subsequently been found to be so much superior. The cause of the rattling was this. On touching a key, the first tracker-hook produced a "click" as it struck against the first *iron* arm; the second iron arm produced a similar noise on coming in contact with the second tracker-hook; the "metal against metal" not only produced a squeaking or a grating as the parts moved, on the finger descending; but, when the finger left the key, and the movement returned, the tracker-hooks vibrated and chattered in the holes of the iron arms. Thus a rustling and sometimes also a chirping noise accompanied the action of the movement when it ascended, as well as when it descended. The removal of the cause of the defects noticed in the two preceding sections, will lead to the disappearance of those just noticed.

813. In modern organs, iron roller-arms are almost always avoided—unless, indeed, the rollers themselves are of the same material, in which case they are of course unavoidable—and wooden ones introduced, as being far more quiet in their action. Even in the few instances where the contact of metal with metal cannot be avoided, as at the junction of the tracker-hook with the pull-down, some organ-builders do not allow the two pieces of metal to touch, but "bush," i.e. line the loop of the pull-down with cloth, to silence the action. For the like purpose of lessening the friction and quieting the motion, other organ-builders introduce into each of the studs which support the rollers a kind of leather button, in the centre of which the roller-pin noiselessly works.

A rattling sometimes caused by trackers flapping together.

814. Sometimes, in "extended" key-movements, a noise will be caused by the long trackers flapping together. This is soon remedied by introducing an additional register. As, however, every additional register, or comb, adds to the friction,—to avoid this latter, some continental builders carry the trackers over little box-wood or ivory reels, by which means they are supported and steadied, without the touch being made heavier or more sluggish.

A key down without producing any sound.

815. Occasionally a key will be found to have sunk, i.e. it will be down, without, however, causing any ciphering. This will arise from some connecting portion of the key movement having slipped or given way. For instance, it will occur if either of the tracker-hooks is broken; and it can, in that case, soon be remedied with a fresh piece of wire. Or, if the rollers are provided with wooden roller-arms, and the union of the roller-arms with the trackers is effected by means of tapped-wires and buttons, it will sometimes arise from the button slipping down the tapped-wire. In this case, all that is necessary to correct the disarrangement, is to screw the button up again, which is done by turning it to the *right*. The tracker, however, should be held firmly, immediately above the tapped-wire, to prevent its twisting, or a cause of second derangement may arise while the first is being removed. A dumb key will sometimes be caused by the breaking of a square, a casualty to which squares are very liable, if they are formed of one piece of wood only, so that the grain of the wood necessarily crosses one of the arms. To cure this fault thoroughly, and prevent its recurrence, a new and stronger square must be provided.

The touch of the manuals too shallow at certain seasons, and too deep at others.

816. In warm, dry weather, the touch sometimes becomes "shallow," and the pallets do not open sufficiently; consequently the pipes sound out of tune, from the inadequate supply of wind, particularly in the bass. In cold, wet weather, the touch, on the contrary, becomes "too deep;" which change renders the playing more difficult, and also causes a tendency to ciphering, from the keys then pressing against the thumping-board. The variations in the depth of the touch are caused solely by atmospheric change; the heat, by drying and contracting the building frame and key movements, slackening it; and the damp, by swelling and expanding them, tightening the touch. There are several ways of remedying these faults.

817. Most modern organs are provided either with small wedges, placed under each end of the square or backfall frame, immediately over each Manual, or with screws; the former of which are pressed in or drawn out, and the latter turned down or up, according as the touch requires deepening or being made shallow. The touch of the entire row of keys can thus be altered in a very few minutes. In older organs which have not these facilities, the depth of touch can only be regulated by screwing or unscrewing the button of every key separately, which process consumes a great deal of time. To make a key "higher," the button must be turned to the right; to make it "lower," it must be screwed to the left. While this is being done, some one should be at the keys, who, by passing the fingers lightly over the key being regulated, and its neighbours, will ascertain whether the key is on an exact level with the others; and if it is not, he will call out whether it is required to be "higher" or "lower," to make it so.

An unevenness in the level of the keys of the manual.

818. A single key will sometimes be out of the level with the other keys. If it is below, without causing a ciphering, the irregularity is most probably caused by the button having slipped, which, in that case, must be screwed up again; and a second one might be added, and screwed up close to the first one, to assist it. If a key is above the proper level, without causing a ciphering, it has probably risen from the rapid return of the movement, on the quick or sudden removal of the finger from the key. A slight tapping on the key will generally be sufficient to cause it, or the movement, to adjust itself.

A key screwed up too high, sometimes causes the speech of the pipes to tremble.

819. A key that is screwed up rather too high, will frequently cause the pallet to open and close slightly and rapidly, admitting a small quantity of wind into the groove by fits and starts, and imparting to the speech of the pipes an effect not unlike that produced by a tremulant when in motion. To stop this, it is simply necessary to unscrew the button a little. A key that has slightly deepened from change of weather, will sometimes produce this effect.

A ciphering caused by the breaking of a pedal-spring.

820. A ciphering is sometimes caused by the spring that should raise a pedal having broken, whereby the weight of the pedal-key drags on the movement, and has the same effect

as the weight of the hand on a Manual key. If a Manual remains coupled to the Pedal while this fault exists, it will cause an apparent ciphering there also, but which will be found to have no real existence on disconnecting the Manual, as the supposed derangement will then immediately disappear. If the Pedals are only furnished with bell-springs, they will be very noisy, as well as more liable to the above accident, and should be removed, and better springs provided.

DISARRANGEMENTS CONNECTED WITH THE DRAW-STOP ACTION AND SLIDERS.

A draw-stop rod will sometimes come out too far, or go too far in.

821. A draw-stop rod will occasionally come out far beyond its proper distance, and will also return too far, and that without affecting the Stop, which will be either always in or always out. This fault arises from the connecting-pin at one of the centres having worked out; and it may therefore occur either at the junction of the draw-stop rod with the trundle-arm,—of the second trundle-arm with the trace,—the trace with the lever, &c. All that is in general required, is, the restoration of the pin to its original position, or its place supplied by a new one.

A draw-stop sometimes very stiff.

822. Sometimes, on the contrary, a draw-stop is very difficult to draw;—in the language of organ-builders, it is "stiff." This derangement is generally caused by atmospheric change. In damp weather, the upper-board and slider become swollen, and, by pressing against each other, increase the amount of friction. The consequent stiffness is usually removed by slightly loosening the screws which fasten down the upper-board, which allows the slider more liberty. On the re-appearance of warm weather, and the subsequent drying, shrinking, and return of the wood-work to its original and precise dimensions, the screws should of course be tightened again. In hot weather, however, as well as in cold and damp, a stiffness will sometimes appear in the action of the draw-stops; but in this case the cause would be the warping of the upper-board or slider, which would lead to a "binding" of those parts. An abatement of the heat would be accompanied by an abatement of the fault. In the course of time, however, it may happen that if the screws of the upper-board are loosened sufficiently to remove all stiffness from the draw-stop, a running will be heard; and, on tightening them, the stiffness will return. This is an evidence that the repeated changes of temperature and condition of the atmosphere have had the effect of disturbing the accurate adjustment of the several parts to one another. When this is the case, the upper-board requires to be removed, the slider taken out, and the several parts "eased" at those points where the binding occurs.

DEFECTS IN THE BELLOWS AND THE WINDING OF THE ORGAN.

A creaking, from friction at the centres.

823. One of the most frequently recurring faults in a bellows, fortunately, is generally one of the most easy to cure; namely, a squeaking or creaking. This commonly arises either from the friction of

the bellows-handle on its centre, or from a similar rubbing at the junction of the pump-rods with the lever or feeders; and is removed by simply applying a little grease.

A clacking, caused by hard valves.

824. A clacking will sometimes be heard at the moment that the feeders are drawn up. This is only perceived in old bellows, and is caused by the valves being made of wood, covered with leather that has become hard, descending on the bottom-board with an audible blow. To remedy this, new leather valves must be substituted for the noisy old ones.

A gasping, from the valves being too few and small.

825. A rushing, gasping sound may occasionally be discerned, as a feeder descends and inhales a fresh supply of wind. This occurs when the valves are too few in number, or are too small, or do not open sufficiently. The wind then forces its way through the gratings or orifices under the valves with so much additional force as to cause a whistling as it goes. To cure this, additional valves must be made.

Bellows work quicker in hot weather.

826. In very dry seasons, the contents of the bellows will sometimes be exhausted much sooner than at other times. This is partly owing to the contraction of the wood of the ribs, which opens the pores; and partly to the shrinking or curling of the leather valves, which together cause more or less wind to escape. Generally, this is only a temporary derangement, which a change of weather will rectify; but should it prove otherwise, the assistance of the organ-builder should be at once secured, as the restoration of a firm and steady wind is of vital importance to the intonation of the organ.

Bellows produce a cracking sound after damp weather.

827. After damp weather, the bellows will frequently produce a sharp, tearing sound when they are first blown, particularly if they have not been used for some days. This, however, does not announce any real accident, though its cause might lead to one. In damp weather, the coat of glue with which the inside of the ribs is covered, to close the pores, becomes softened; which causes the ribs, as they lie together, to adhere slightly. When the bellows are subsequently blown, the ribs are separated, producing at the same time the sound above noticed.

Tremulousness, from the length and elasticity of the column of wind.

828. Sometimes the working of the bellows affects the speech of the pipes; i. e. a slight waving or forcing of the tone will be heard at the moment the feeders commence and complete their operation. This arises from the additional compression which takes place at the moment that the feeder and the surface-weights alternately exercise their influence. The feeder, before it can introduce fresh wind, has to overcome the pressure of the surface-weights by the exercise of *more* than an equivalent force; and when this under and upward pressure ceases, the surface-weights and top-board return and descend upon the wind with all their original pressure. In this manner a series of little jerks are given to the wind at the commencement and completion of each stroke, which are sometimes communicated to the

speech of the pipes, particularly if the wind-trunks are small or long. To remove this defect, a concussion bellows is usually applied; but a more effectual remedy would be the introduction of wider, shorter, and more direct wind-trunks. When the wind-trunks are small or long, and the supply of wind to the sound-board barely adequate, the column of wind becomes more elastic; in consequence of which, not only is every little and perhaps unavoidable defect at the bellows conveyed to the pipes, but it is also exaggerated. When, on the contrary, the wind-trunks are broad and short, the column of air has greater firmness, from its greater bulk; and is less elastic from the same cause, aided by its lesser length; consequently it is not nearly so liable to communicate every little disturbance at the bellows to the speech of the pipes.

Tremulousness, from shortness of supply.

829. Sometimes if a chord be held down with the right hand in the treble, on adding a three-part chord with the left hand in the tenor, the treble pipes will be weakened in their speech for a moment, and then will recover themselves; and on withdrawing the left hand from the keys, the treble pipes will "raise their voices" for an instant, and then reduce their tone to the usual strength. These defects are sure indications of the wind-trunk, or the wind-chest, or both, being too small. In other cases, an organ will stand the above test successfully; but if chords be held down in the treble and tenor with the two hands, and a disjunct passage be played upon the Pedals in the bass of the Manual, a tremulousness in the tone will appear in the upper parts. This will show that the wind-supply at the grooves is still inadequate, from one or other of the causes already mentioned.

Unequal intonation, caused by small grooves and pallet-holes. A robbing.

830. In some organs it is found that certain Stops sound sharper and brighter, or stronger, when tried by themselves; and flatter and duller, or weaker, when used with the others. This serious fault rests either with the grooves, which do not hold sufficient wind to supply all the pipes effectually; or with the pallet-holes, which do not admit the necessary quantity. The "robbing" usually manifests itself the most strongly in the lowest octave or octave and a half of the sound-board. It invariably appears in old sound-boards, and is not always absent from new ones. There are many simple ways of ascertaining whether a Manual organ is properly supplied, or not, with wind in the bass. If, on drawing the Mixtures by themselves, and holding down one of the lowest keys, the pipes sound firmly in a certain pitch, and with a certain amount of strength, and if, on adding the other Stops, the Mixtures fall in pitch and become more quiet in their tone, it is clear that the grooves either do not hold, or do not receive sufficient wind. Or if the Reeds be drawn alone, and they speak with a certain amount of crispness, promptness, and strength, but, on adding the other Stops, the Reeds sound tamely, sluggishly, and more quietly, it is evident that the demand on the wind in the grooves is greater than the supply. The only effectual remedy for this defect is the introduction of a new and larger sound-board, with more capacious grooves in the bass—or with double grooves,—and with larger pallet-holes and pallets. In the absence of this, the small Stops have to be tuned in the bass, with all the Stops on the sound-board drawn, that allowance may be made for the *flattening* effect caused by the robbing; and this is why the

small Stops sound sharper, and perhaps tremulously, when tried by themselves, at which time they receive their full supply of wind.

A hissing, arising from an escape of wind.

831. Sometimes a hissing or whizzing sound is heard to emanate from some part of the organ. The sound itself is, perhaps, scarcely perceptible, but it arrests the attention by its continuance. The exact place where it occurs is frequently difficult to discover. An engineer has an advantage over an organ-builder, under parallel circumstances; for, in a steam engine, the locality of a slight leakage is immediately made evident by the escaping steam turning to vapour and attracting attention; whereas no such assistance appears in an organ to guide the builder to the seat of an analogous fault. This is frequently ascertained by means of a lighted candle, the flame of which will flicker as it draws near to the place where the escape is taking place, and as it gets into the unusual draught caused by it.

832. The hissing frequently arises from an escape of wind at the joint of one of the wind-trunks; which will be caused by the leather covering having become loosened, from damp, age, or decay. This is remedied either by glueing the leather down again; by applying a fresh strip of leather, if the other is unsound; or even by fastening a piece of thick paper over the little hole, saturating the stopping with glue. An escape of wind will sometimes take place at the side of a pull-down, through the hole in the brass plate; particularly if the action of the pull-down has not been perfectly horizontal, and has worn the hole into an oval shape.

FAULTS CONNECTED WITH THE SPEECH OF THE PIPES.

Small pipes are frequently dumb, tremulous, or weak in their speech.

833. It frequently happens, particularly with regard to small open Flue-pipes, that a pipe will be "off its speech," i. e. will not sound, or it will sound tremulously, or with less than its proper strength. A most frequent cause of this fault is *dust;* a very small portion of which—so small that it would not affect the speech of a large pipe at all—being sufficient to render a small one dumb. If the fault is a general one throughout the organ, it can only be remedied by a thorough cleaning. If there are only isolated instances here and there, they can be rectified by taking the few pipes out, one by one; wiping the surface of the languid, and carefully dusting the nicking, and clearing the wind-way with a fine brush.

Flue-pipes become unequal in their strength and quality of tone from various causes.

834. Sometimes, however, an irregularity will be caused in large or small pipes by some disarrangement of the pipe itself. The upper-lip may be pressed in too far, or not far enough; the under-lip may have met with a similar temporary derangement; or the languid may be too high or too low. The foot-hole may have become slightly contracted, from the pressure of the body of the pipe upon the foot; or it may have become too large from the partial decay of the apex of the foot. Any one of these accidents would affect the intonation of the pipe, causing it to sound too loud or too soft, tremulously, or in the octave above; and it is often more difficult to

discover which may be the true cause of the fault in any individual instance, than to correct it when it is found out. A pipe that sounds too loud, sometimes has its tone softened by pressing the under-lip a little nearer to the languid, which reduces the width of the wind-way, and therefore allows less wind to enter the pipe; and by altering the position of the upper-lip in the same direction. A pipe that sounds too weakly, frequently has its power increased by the opposite process.

A pipe sometimes sounds its octave, from the effects of dirt, or over-blowing.

835. A pipe will sometimes "sound its octave;" and Stops of small scale, as the Dulciana, are particularly liable to such derangement. This may be caused by a little dust having fallen into the wind-way; or by the pipe having rather too much wind; or even by simply a change of temperature. All Stops of slow speech—"heavy intonation," as the Germans have it,—as, for instance, the German Gamba,—also are liable to casualties from similar causes; and, like the Dulciana, may be thrown off their speech, if the bellows do not give a perfectly equal blast. A pipe that has too broad a wind-way, or an insufficiently high mouth, will also speak its octave.

The tone of wood-pipes influenced by change of temperature.

836. Wood-pipes are much influenced by change of temperature. In rainy weather, the damp, by swelling the fibres of the wood, presses and closes the pores; and, by thus rendering the wood more compact, firm, and sound, improves and strengthens the tone. In very wet seasons, however, it is possible that the change may so far affect a pipe as to lessen the height of its mouth; and, by swelling the block, lessen the breadth of the wind-way, which would have the effect of slightly flattening its pitch, as well as perhaps affecting its speech. In an organ that is placed in a damp situation, these vexatious changes and derangements are both frequent and unavoidable. In dry weather, the wood may shrink and become more porous, the tone then being weaker. The height of the mouth, from the excessive dryness and contraction of the wood, may be increased, as well as the breadth of the wind-way, which would raise the pitch of the pipe, and perhaps also alter its speech. The influence of these changes is the most discernible in the large open wood Pedal-pipes, which frequently will sound fuller in wet than in dry weather.

Stopped wood-pipes sometimes deranged by heat and drought.

837. Stopped wood-pipes are in summer, occasionally, put out of order by the stopper shrinking and falling into the pipe; raising the pitch and destroying its quality. The stopper must, in that case, be taken out and restored to its proper place; some means being at the same time taken to make it fit tightly. This can frequently be done by putting a layer of paper between the stopper and the leather cover, on all four sides. Or an additional covering of thin leather might be put over the stopper, if this will not make it fit too tightly. If a stopper that fits too tightly be driven into a pipe, it may cause the front or back to separate slightly from the sides, at the joints; and, by so causing the pipe to become unsound, render the tone false and weak. A defective intonation will also arise, if the stopper is not driven in perfectly level, but sideways.

Reed-pipes very susceptible of change of temperature.

838. Reed-pipes are very delicate in their nature; and are frequently disarranged by the merest trifles. When it is borne in mind that, even in a large Reed-pipe, it is not the long tube, but the small tongue that originates the tone,—that the smallest particle of adhesive substance on the tongue will sometimes retard the rate of its vibration,—and that a very small piece of grit on the edge of the mouthpiece is frequently sufficient to prevent the tongue striking equally and truly,—it ceases to be a matter of wonder that a Reed-pipe should here and there so frequently get a little out of tune, or irregular in its tone. Moreover, the slightest shifting of the tongue will prevent its sounding properly. Or, if it should be rather too thick and stiff, or too much curved, it either will not sound at all, or only weakly, as the draught cannot then make it reach, or at any rate strike the mouthpiece with the requisite firmness. On the other hand, if it be too thin, weak, or insufficiently curved, it will strike the mouthpiece too violently and cause a "cackling." A tongue that is too stiff, or stands too far from the mouthpiece at the lower end, is set right by being reduced in thickness, or by having its curvature lessened. A thin or weak tongue cannot be altered for the better, and therefore should be removed and replaced by a stronger one.

839. The above are some of the most usual faults or defects occurring or met with in organs. Their ordinary *causes* have been specified, to show that the most careful vigilance of the organ-tuner is frequently insufficient to prevent their occasional or periodical occurrence. The *nature* of the several faults or defects have been explained, that the organist may be enabled to discover for himself whether they are of a superficial or of a vital character. Their usual *remedies* have also been given, in order that the organist might, if the derangements are of a superficial and trivial nature, proceed to rectify them himself, if he is quite sure that he is capable of doing so; or, if they are of a more vital and important nature, that he may at once call the attention of those in authority to them, and obtain from them the necessary permission to procure the assistance of the organ-builder to effect the necessary repairs or improvements;—for although, as Schneider observes, "the organist is not to be the organ-builder," yet it is peculiarly his duty to act as the protector and conservator of the instrument.

840. On the same page from which the extract at the commencement of this chapter is taken, and in continuation of it, Schneider proceeds to say—"If the organist conscientiously fulfils his obligation in this respect, as above described, those who have to provide for the keeping in repair of the Church and organ must also do their part; must take notice immediately of the report of the experienced organist; and not regard the expense, to have any defect which may be discovered, and which the organist himself cannot rectify, immediately remedied by a competent organ-builder. Unfortunately, this is frequently not the case; for, as experience everywhere shows, there are few organs in *good* condition; and the fault is not always to be attributed to the ignorance or the carelessness of the organist, but to the want of attention being paid to his complaints, and the dread of expense on the part of the authorities;—the organ is rather left to become completely spoiled, than an endeavour made to remedy, in good time, whatever is capable of being remedied."

DIVISION IX.

SUGGESTIONS FOR THE CONSIDERATION OF THOSE WHO HAVE TO SUPERINTEND THE CONSTRUCTION AND ERECTION OF AN ORGAN.

CHAPTER XXX.

341. The preceding chapters of this work having been devoted to a descriptive analysis of the structural details, &c. of an Organ, it now remains to treat of other essentials which call for the attention more particularly of those to whom the duties of preparing the specification and superintending the construction of an organ are entrusted.

THE COMPASS OF THE CLAVIERS, AND OF THEIR SEPARATE DIVISIONS OF THE ORGAN.

342. The first subject to be considered, is the compass necessary for the Manuals and Pedals, together with their respective departments of the organ.

343. It is most desirable that patient attention should be devoted to this question, since every separate compass yet devised has its advocates, even among those whose opinions are entitled to great consideration; but yet, which same opinions, when compared, are found to be conflicting. As, moreover, what is advanced in favor of one compass, is not unfrequently accompanied by something else by way of objection against all or most others, it behoves all who would desire to arrive at a just conclusion on this very important subject, to weigh all the arguments for and against each plan, before making a decision; otherwise, with the purest intentions, his efforts may only end in a perpetuation of the existing confusion.

Precedents for nearly every variety of Clavier range.

344. There are precedents for almost every imaginable variety of range, both of Manual as well as Pedal; and if the selection of the one from among the number were a question of no greater moment than the gratification of individual taste, or did not involve some violation of artistic arrangement that would not militate against the proportionate development of the separate departments of which an organ should consist, nor entail the sacrifice of funds and room in its consequences, there could be no difficulty in the way of any compass whatever being adopted that fancy might dictate. But the case is far otherwise. On a just view of this matter depends the successful issue of the work; its influence pervading the arrangements of the entire instrument. It is very important, then, that the most careful consideration should be given to this sub-

ject, before proceeding any further in the work, particularly as a false step in this direction, once taken, cannot afterwards be retraced.

The compass of the manuals; the confused state in which the question is involved in England; and the importance of a correct view of the subject.

845. Those who have been much in the custom of visiting English Church Organs, and observing their general arrangements, must have been struck with the remarkable variation that exists in the compass of the Manuals and Pedal of different instruments. A dozen Organs might be visited promiscuously, without any two being found to agree precisely in the above respects. Some have short-octave GG Manuals; others, GG Manuals with long octaves. Some have Manuals descending a note lower, to FFF; others, Manuals to CCC; while a fifth class will have Manual organs of the orthodox CC range. Then of the Pedal: some Organs have an octave of Pedals commencing at GG; others, an octave and a half beginning on the same note, or perhaps on FFF. Some have two octaves of GG Pedals, while others have from two octaves to two octaves and a half of CCC Pedals. Such is the undecided state into which these divisions of Organ arrangement had fallen in this country, previous to the commencement of the now widely-spread desire for its amelioration.

How the true manual compass is to be ascertained.

846. That *all* the compasses for Manual and Pedal just cited can be *equally* correct, is impossible; either some are too long, or others must be too short; or, supposing a medium range to be the true one, then some must be as much too short as others are too long. The question, then, is, out of the number, which are of the correct compasses and which are not?

847. The presence of a certain number of keys on the Manual and Pedal claviers, and an equal number of semitones in their respective Organs, must be necessary to render an instrument adequate to all the purposes and uses of a Church Organ. Do those Manuals,—the question of the compass of the Pedal is deferred for the present,—then, that extend only to CC, *fall short* of this needful range; or do the various kinds of long octave ones *exceed* it by just so much as their Manuals descend below that key? Or, is the medium compass, the GG, the correct one, and consequently the CC range as much too short as the CCC is too long for the required purposes? The sources to which alone reference can be made, with the certain result of finding a correct solution to the above problems, are the Choral and Instrumental compositions that are most frequently heard in, and which are held in the highest esteem as accessories to the Church Service; and for the accompaniment of the one, and the performance of the other, the Organ itself is employed in our Ecclesiastical edifices. If reference then be made to the works of the long list of English Choral writers, and to the scores of Handel, Beethoven, Bach, Mendelssohn, &c. this examination will be attended with the following results.

848. In the selected movements from the works originally written with orchestral accompaniments, such as the solos and choruses in Oratorios, Masses, &c. it will be observed that the violoncello part, which comprehends within its downward range also that of all vocal basses, *never* descends below the CC note, which note (as all musicians know) is the lowest one on that instrument. The double bass indeed is

a deeper-toned instrument; yet, as it does not give a sound in accordance with the notes written, but the *octave below*, as far as its compass permits, its representative is correctly to be found among the unison (16-feet) Flue-work of the Pedal Organ. Again, if the masterly compositions written expressly for the Organ, by Bach, Mendelssohn, Hesse, and others, be consulted, it will be seen that the greatest extent to which the Manual part of those classical works descends, is also CC. The finest and most elaborate sacred musical productions, then, whether they be essentially Choral, originally written with Instrumental accompaniments, or composed exclusively for the Organ, neither require nor *recognize* a greater extent of compass downwards than that possessed by the *shortest* of the various kinds of Manual above mentioned. A few exceptions to this otherwise universally supported fact, may indeed be found in the admirable Organ compositions of the late Samuel Wesley, Thomas Adams, and Dr. Wesley of Winchester; yet these examples would scarcely be deemed sufficient to outweigh the united authority established by the voluminous works bequeathed us by the writers previously named. That the CC Manual *does* afford ample scope for the perfect execution of the *hand* parts of all descriptions of music used in the church, excepting the few excellent works already specified, has never been clearly disputed. And that the CC Manual range is the best one for concert-room Organs, is equally beyond a doubt. So much, therefore, is greatly in favour of the CC Manual Organ.

Arguments against the CC Manual compass and in favour of a longer range.

849. Against it, and in favour of a longer compass, it is sometimes urged—(1) that in accompanying the Choral Service, and more particularly the quieter parts, a soft bass is frequently required (though not written) *below* CC; (2) that if the Manual keys are made to *end* on that note, then the deeper sounds have to be obtained from the Pedal; and (3) if that department be furnished with a fair proportion of Stops, a shifting of these with every change from "Full" to "Verse," &c. becomes necessary; or (4) if there be but one Stop on the Pedal, as is too frequently the case, the choice then lies between a ponderous and heavy bass, and none at all.

850. These objections are founded on the manner in which CC Organs are sometimes made in England, rather than on the continental system, according to which they should be, and occasionally are, built. It is not a correct conclusion, that if the Manual *keys* stop at CC, the Manual *sounds* must also cease there; any more than it would be that the *upward* range of an Organ must cease at f^3 in alt, if the keys do so. When there are two Manuals, the Great Organ should *invariably* have a Double Stopped Diapason (Bordun) throughout. This is one of the *fundamental* laws of the German system of Organ-building, and is *constantly* adhered to in the construction of even the smallest Church Organs of that country (see foreign specifications, Nos. 54, 55, 61, 62, 87, 102, 104, &c.); and it does not follow that, because the Great Manual of an English CC Organ is sometimes made without a Stop of 16-feet size of tone, the inconveniences that must arise from such omission are to be attributed to a principle of Organ-building, from which it is actually a departure. Where a Stop of the kind in question *is* disposed—and it should never be absent,—instead of the downward range of the deep Manual sounds being *limited* by the termination of the keys at CC, it is *increased* to the extent of

seven semitones *beyond* what an old-fashioned GG Manual could produce: so that, even on the question of "depth of tone," a CC Manual Organ on the Continental principle has the decided advantage over a GG Manual Organ on the English principle. Furthermore, the concentration of so many deep sounds on the Manual obviates the "necessity" for employing the Pedals so constantly, if the performer cares to dispense with the use of the latter; and thus the second objection to the CC Manual is, to a great extent, done away with. But even supposing the continued use of the Pedals to be desired, so far from the shifting of the Pedal Stops to obtain a soft bass being a matter of "necessity," some German Pedal Organs are made with a wind-trunk valve (Sperventil) to cut off the wind from the Pedal Reeds and Chorus Stops, and worked by a Stop-handle that is shifted as quickly as a Pedal Coupler; by means of which a soft or loud Pedal may be obtained with the greatest facility.

851. One fact relating to the subject of the deep Manual tones should not here be omitted. While the extra keys below CC are said to be so necessary for soft accompaniments, the Second Manual (Swell), on which the quieter parts would frequently be played, is always made not only *without* those very keys, but, in the great majority of cases, also *without the next whole octave above.* This important circumstance much weakens the position, as to the "necessity" for the Manual keys descending below CC, to meet the requirements of soft playing.

852. Nay, more; when the Second Manual Organ (Swell) in GG Instruments is made to the short Tenor c compass, it is usual to arrange the keys beyond to act either on the Great Organ, or on the "Pedal Pipes." Now, in the former case, a shifting of the Great Organ Stops must be made with every change from *forte* to *piano,* and back again; in the latter, there will be the strong and unseasonable bass; so that the second and third objections, if they are such, exist, to at least an equal extent, in Organs of long compass, and are not by any means peculiar to those of shorter range.

853. The CC is the only Manual range now accepted on the Continent. In Germany, Holland, Belgium, the Netherlands, Switzerland, France, &c. no Organ is ever made to any other compass. The celebrated Organs at Haerlam, Freiburg, Frankfort, Hamburgh, Rotterdam, Dresden, St. Denis, &c. are all CC Manual Organs*.

854. Among the 300 or 400 English Organs that have been either built or remodelled conformably with this range, may be mentioned those at Christ Church, Newgate Street; St. Paul's, Knightsbridge; St. Peter's, and St. Michael's, Cornhill; St. Michael's, Chester Square; and St. Giles's, Camberwell. Also those in the Birmingham Town Hall; All Saints' Church, Northampton; the Collegiate Institution, Liverpool; the Parish Church, Ashton-under-line; &c.

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* It is worth the mentioning, that the Manuals of Spanish and Italian Organs sometimes descend below CC. Those of the new Organ in the Cathedral at Seville go down to AA; those of the two Organs in Milan Cathedral descend to FFF; those of the chief Organ at St. Peter's at Rome range to CCC, short octaves; while those of the Organ at St. Alessandro at Milan are of CCC range, and of complete compass. (See accounts of these Organs in the Appendix.)

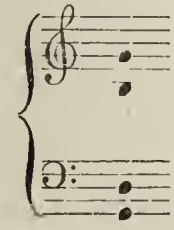
Much room, and a great expenditure of funds required to extend the compass of a Manual Organ below CC.

855. The CC compass for a Manual Organ, at the same time that it is quite satisfactory as to completeness and convenience, is far *less costly* than one of longer range; not that *cheapness* ought to be made a consideration in any case, where the object is to be devoted to the service of the Church, and where the question should not be "what will do," but *what is best.* Still it does so chance to happen that a given number of Stops to CC will cost very considerably less than when extended down to GG, or lower; and the money and space saved by observing the distinction between what is essential and what is not, are of vital importance where funds and room are objects (and where are they not?), since they can then be devoted to the proper proportionate development of other departments which are too often straitened, or even altogether excluded, in order to allow of the lengthening out of a Manual Organ.

856. Some idea may be formed of the extra cost of a long octave Manual Organ, from the increase that is made in the price of *one Stop alone* by this downward elongation. The charge for an Open Diapason to CC is about eighteen pounds. The cost of the same Stop, if extended to GG, will be increased to nearly thirty pounds; if the FFF and FFF sharp be added, its price will be about forty pounds; and if its compass be further extended down to the CCC or 16-feet Pipe, and a good quality of metal be preserved throughout, its cost will not fall far short of seventy pounds. From these few facts, it will easily be seen that a hundred pounds may be soon expended in extending the Stops of even a single Manual, and this too, without extending its resources as a *Manual* Organ in any shape or way.

The true method of increasing the resources of a Manual Organ.

857. For an illustration of this fact, try two Manual Organs by the same builder, furnished with Stops similar in every respect, only that the compass of those of the one shall stop at CC, while those of the other shall extend to GG, or anywhere else. If this



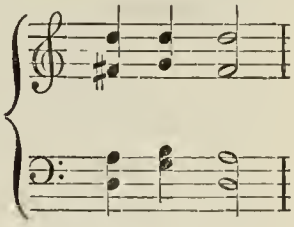
or any other chord be struck in pure four-part harmony, first on one of those Manuals and then on the other, the sound will be found to be precisely the same in each case, both as regards quantity as well as quality; in other words, the tone of the GG Manual Organ will possess no advantage over that of the CC one. The reason of this is obvious. Increasing the *compass* of a Manual, and increasing its *resources* as to tone and variety, are two widely different things, and they are worked out by totally opposite processes. The former end is attained by keeping to the same Stops, and augmenting their range; which is like adding a fifth or sixth string to the stringed instruments in a band, with the view to increasing their efficiency. The latter is effected by preserving the original compass (that compass being a full and complete one), and engrafting thereon other Stops that emit sounds differing in pitch, or quality, or both, from those produced by the original ones; a course which is equivalent to increasing the number and variety of instruments as

the means of extending the resources of an orchestra. As the capabilities of a band would be extended,—both in regard to its power of varied combination in the detail, and its grandeur of tone in the aggregate—by increasing the number of distinct instruments, so are the analogous powers of the Organ correspondingly augmented by increasing the number of distinct Stops; and they are increased *only* by this principle of development. A Manual can but be complete, let its compass be extended below CC as far as it may; even as a violin could be no more, were the number of its strings to be doubled, or even trebled Supposing such an experiment were really to be tried with a violin, music for that instrument would have to be *altered*, before any use could be made of the additions as *violin* features. In like manner all Church music has to be altered, before any use can be made of the keys below CC as *Manual* features.

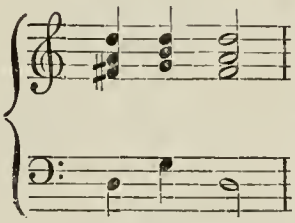
How it may be ascertained whether certain keys are essential or not as manual ones.

358. The best proofs of there being no legitimate use for the long octaves with the *hand*, are to be gathered from the deviations which it is necessary to make from the musical text, in order so to employ them. The keys acting upon these additional tones and semitones are placed, as a matter of course, *beyond* the CC key; and, as the Manual part of all descriptions of Church Music alike only extends *to* that note (as has been already shown), they are not available as above, so long as a composer's notation is adhered to. To make use of the extra notes with the hand, the hand must be transferred an octave lower than the music directs; and single notes, octaves, or even full chords played down there: the Tenor part of the composition, meanwhile, being either entirely abandoned, or thrown an octave higher; the consequence being in either case a material departure from the musical text, and a most undesirable transposition of the parts.

359. Speaking of the superior effect that divided harmony produces upon the Organ, over close harmony, Forkel says, "by this means, a chorus, as it were, of four or five vocal parts, *in their whole natural compass*, is transferred to the Organ. Let the following chords, in divided harmony, be tried,



and then compare how the following,



a more common way of rendering the same, sounds in comparison; and it will be evident what injury must accrue to the effect, from playing a whole piece in such a manner. *In the former manner* BACH *always played the Organ.*" (Life of Bach, Boosey's edition, p. 33.)

360. Taking all the foregoing circumstances into consideration, it seems clear that the "long octaves" do not possess any real advantages as *Manual* keys, to compensate

for their enormous cost. And it is as indisputable that their application to certain departments—say the Chief Manual, or Great Organ—is often the means of excluding many of those which would be so from others; of reducing the number and amount of their contents; or even of necessitating their entire omission; by absorbing for their construction a sum from the gross amount which would be sufficient to secure the amelioration of one, if not more, of the above material blemishes. A few general illustrations may be given of these last-mentioned facts. To advance more specific ones would be inconsistent with the object of the present work.

The ameliorations that might be effected on a given specification, by regulating the outlay otherwise than in the construction of unessential Manual notes.

861. If the general arrangements of some modern £400 or £500 GG Organs be examined, they will in the majority of cases be found to be as follows—

Compass of Great Organ, GG to f^3 in alt, with GG sharp ..... 59 notes.

Compass of Swell Organ, Tenor c to f^3 in alt.. 42 notes.

The Swell Manual continued down to GG, and made to act either on the Bass of the Great Organ, or on the Pedal Pipes, at pleasure.

Compass of Pedal-board, GG to Tenor c..... 18 notes.

Compass of Pedal Pipes, from CCC to CC ..... 13 pipes.

862. From these particulars we perceive that, while the Chief Manual or Great Organ is carried *half an octave lower* than CC at a considerable cost, the second Manual Organ (Swell) is discontinued *a whole octave above* that note; the funds *then* not admitting of the latter department being made complete; and the Pedal Organ consists of "half" a Stop. Now it need scarcely be urged that the only correct points in which the two Manual Organs ought to differ from each other, are the number of Stops, or their strength of tone, and not in the *compass*, which should be the same in either case: for what is required for "soft accompaniments," is a Manual with Stops of a subdued tone, and not one without any bass to it.

863. The old Organ-builders, although compelled to make instruments to all kinds of compass, and thus to give an air of vacillation to some of their arrangements, but for which they must not be held responsible, and, for reasons already shown at page 131, were yet fully sensible of the propriety of making both Manual Organs to consist of the same number of keys; unless indeed, as was sometimes the case, particularly in their very small instruments, one was only designed as a Solo or Echo Organ, and not calculated for use in Choral accompaniments. A few remarkable exceptions only to this rule are known to exist. In the generality of instruments built during the latter part of the seventeenth century, throughout the eighteenth, and even at the commencement of the present, we constantly find the Second Manual (Choir) of equal range with the First or Great.

864. No doubt the Second Manual Organ is, in the present day, sometimes made shorter than the requisite compass, through lack of funds; and when such imperfectness is really the work of necessity, nothing can be said against it. That, however, is a separate question. When there are funds sufficient to pay for a GG Great Organ and a Tenor c Swell, there *must* be sufficient also to procure a Second Manual Organ of nearly, if not quite, perfect compass, if the expenditure be so directed; so that the above plea is hardly admissible under such circumstances, since

the lessened range of that department can then no longer be attributed to the smallness of the grant, but to the mode of its outlay.

865. The Swell being thus limited in its compass, some substitute is usually devised to supply the place of the omitted octave. The most usual expedients are to extend the second *Manual* downwards to the same range as the first or Great Organ, and make the continuation keys communicate either with the Pedal Pipes or with the Bass keys of the Great Organ. It is only necessary, however, to advert to the derivation of the terms Manual and Pedal ("manus," a *hand*, and "pes," the *foot*); when the inaccuracy of bringing on to a *Manual* certain Pipes designed exclusively for the use of the *feet*, and distinctly designated "Pedal" Pipes, will become apparent. Besides, the Pedal Pipes are the most ponderous-toned pipes in an Organ; and therefore, as a Bass to the Manual designed for *soft* accompaniments, are singularly inappropriate. Again, in many examples where there are "Double" Pedal Pipes, instead of there being an interval of a semitone only between the unison sound of the last key acting on the Swell and the first one on the Pedal Pipes, the two sounds are separated by an interval of a minor ninth; so that not only is the sound of the borrowed Bass opposed to its newly applied purpose, in the several respects of character, strength, and quality of tone, but in pitch it is of "16 feet:" whereas, for the Manual, the 8-feet pitch is most required.

866. Neither does the Bass octave of the loud or Great Organ form a satisfactory continuation to the soft or Swell Organ; for the reason that, if the same combination be drawn on both Manuals, the strength of the Bass (Great Organ) will be too strong to match well with the remainder (Swell); or if, to obviate this, fewer Stops be drawn on the Great Organ, there will exist but slight affinity between the tone-character of the Bass and the other parts. As before observed, if such arrangements as these arise from unavoidable causes, it is one matter; but if they are purely voluntary, as they must be admitted to be when they appear in conjunction with a GG Great Organ, it is quite another.

867. The next point to be illustrated is the extent to which "long octaves" limit the Specification of the different departments of an Organ.

868. A good average specimen of a GG Great Organ contains the following 10 Stops; viz.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesqui-altera—3 ranks.
8—Mixture— 2 ranks.
9—Trumpet.
10—Clarion.

869. By confining the above 10-Stop Great Organ to the C C compass, instead of extending it down to GG, the sum so saved would nearly, if not quite, defray the cost of the following Stops; viz.

1—Double Stopped Diapason . . 16 feet tone.	9—Twelfth . . . . . $2\frac{2}{3}$ feet.
2—Open Diapason . . . . . 8 feet.	10—Fifteenth . . . . . 2 feet.
3—Open Diapason . . . . . 8 feet.	11—Piccolo . . . . . 2 feet.
4—Stopped Diapason . . . . . 8 feet tone.	12—Sesqui-altera . . . . IV ranks.
5—Dulciana to Tenor c . . . . . 8 feet.	13—Mixture . . . . . III ranks.
6—Stopped Fifth . . . . . $5\frac{1}{3}$ feet tone.	14—Trumpet . . . . . 8 feet.
7—Principal . . . . . 4 feet.	15—Clarion . . . . . 4 feet.
8—Flute . . . . . 4 feet.	

That is to say, the number of pipes to most of the keys could be increased from 13 to 20; the range of deep sounds extended downwards to the extent of seven semitones; and the capabilities of the department for varied combination nearly doubled.

870. Or, supposing the sum saved were expended on the improvement of an originally contemplated Tenor c Swell, containing the following six Stops; viz.

1—Double Stopped Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Trumpet.
6—Hautboy.

871. Not only could its Specification be made to take the following improved form—

1—Double Stopped Diapason..16 feet tone,
2—Open Diapason ..... 8 feet,
3—Stopped Diapason ..... 8 feet tone,
4—Principal ..... 4 feet,
5—Fifteenth..... 2 feet,
6—Mixture ..... V ranks,
7—Trumpet..... 8 feet,
8—Hautboy..... 8 feet,

but its compass could be extended downwards to at least Gamut G. That is to say, besides increasing the number of pipes to each key from 6 to 12, about half of the 8-feet octave could be added to the Swell Manual Organ, which would be far more useful than half of the 16-feet octave to the Great Manual Organ.

872. Or again, if the amount saved as above were to be laid out in getting rid of the ordinary "Pedal Pipes" of a single octave only in compass—in which the Unison and Double pitches are so strangely mixed together,—and providing something more intelligible in their stead, the following Stops could be secured:

Pedal Organ, compass C C C to tenor d.
1—Open Diapason..... wood .... 16 feet.
2—Stopped Diapason..... wood .... 16 ft. tone.
3—Trombone..... wood .... 16 feet.

873. The questions that here suggest themselves are, first, whether the principle of Organ-construction that *necessitates* the confusing of the Manual Organ with the Pedal Organ, and the Pedal Organ with the Manual—making the one too long and the other too short—each rendered dependent on the other, while neither of them are in themselves complete, nor even capable of forming a satisfactory whole when united,—whether such a system should be perpetuated, in preference to the other principle which has for its foundation the requirements expected of each department, and which, from its well-tested merits, has become the standard principle in nearly all other countries but England?

874. Or, secondly, if either of the three modifications just suggested on the original Specification were to be followed, whether there would not result a much more satisfactory instrument?

875. It should be remarked that the *shortest* and *least expensive* of the various long octave Manual Organs was selected wherewith to draw the foregoing parallel Specifications. Had a longer compass been chosen, a still more surprising difference would have resulted; which would also have been the case even with the same compass, had two Manual Organs been taken into account instead of one; or even one Manual Organ, but having more Stops.

Other views in favor of G G Manuals, and against C C, considered.

876. There are other grounds yet to be noticed, on which the desire for the perpetuation of elongated Manuals is founded.

877. It is urged—(1) that the introduction of the extra keys offers scope for the production of many fine effects; (2) that their presence is absolutely essential, to serve as Pedal tones; and (3) that shortening the compass is going backwards instead of forwards.

878. That *sounds* below C C on the Manual are of the greatest use, and capable of most impressive results, has already been admitted, and is indeed self-evident. What is maintained is, that the desirability of their introduction does not call for a *lengthening of the key-board.*

879. When, for example, such sounds are required, it is very easy to draw the 16-feet Stop alone, when they will be obtained not only to G G, but seven semitones lower. For this method of using the Organ we have the authority of the greatest Organist and Organ-composer that ever lived. Sebastian Bach not only played, but actually wrote some of his music to be executed with the left hand on a 16-feet Stop only; by which means he drew from his instrument the practical effect of a C C C Manual, without overturning the theory of Organ-building to obtain it. See the translation of Forkel's " Life of Bach," p. 86.

880. No rules or specific directions, setting forth the manner of using the extra keys of a G G Organ with the hand, with fine effect, have ever appeared in print; and music for the Organ, of what kind soever, offers little or no assistance on the subject; but, on the contrary, generally discountenances them. So that all is left to chance;—one has to *invent* a mode of using them, if they are to be *touched* at all;—and it is but a natural consequence that the attempts should in different cases be attended with various degrees of success. That the Manual keys below C C are seldom made use of with the *hands*, when they are introduced, is clearly evinced by the comparatively *perfect* state in which those keys are *invariably* found, when most of the others are so much worn as to require renewal.

881. But whatever may be the effects attendant on the lengthening of the Manuals, if they be placed in juxtaposition with the decrease sustained in the number of the Stops; the loss of the numerous soft combinations that could have been made with the aid of those Stops for accompanimental purposes; and the impossibility of playing the best music even *correctly*, still less with adequate effect; it will then be seen what sacrifices must be made to secure the presence of five semitones—the advantages of which, when they are obtained, is very generally questioned.

882. The next position, " that the presence of the extra notes on the Manual is essential, that they may serve as Pedal tones," offers anything rather than assistance to the principle of Organ-construction it is intended to support. The anomaly of attaching to the *Manual* keys, Pipes that are expressly adapted for the *feet*, has already been pointed out. The above plea is in favor of placing certain keys and tones on the *Manual* which are conceded to be chiefly for the use of the *Pedals*. This creates a fresh discrepancy, and one that assumes a more prominent form, when it is considered for what purpose the extra tones are said to be introduced, and how far it is possible they can effect the end desired. If the Manual Unison Stops are required to serve as substitutes for the Pedal Diapasons, they should descend as far as those Diapasons,

namely, to CCC; if as Octave Stops, only to CC. The GG range is 7 semitones too short for the one purpose, and 5 too long for the other; therefore the peculiar unfitness of the notes in question, from BB to GG, for rendering the assistance sought, in a correct and intelligible manner, becomes obvious.

883. In suggesting the adoption of the CC compass for the Manual, it must not be concluded that the notes below CC are not required *anywhere*, but simply that they are not required on that Clavier as *Manual* notes. This leads to the third objection, that "shortening the compass is going backwards instead of forwards." This appears, at first, to be a well-grounded objection; yet, in reality, it admits of a ready reply. The great question is not which is the longest, but which is the most correct, complete, convenient, compact, and economical compass. These questions have already been once considered, but they may be further illustrated by a return to our former parallel. Supposing a fifth and sixth strings to have been added to a violin, and, no legitimate use being found for them, they were taken off again; the violin would not, on that account, become a less perfect instrument;—there would be no "going backwards." Or, to draw the parallel more closely, if, to supply the two extra strings for the violin, two had been abstracted from the violoncello; and it was afterwards desired that *both* should be rendered efficient; there could be no question as to the propriety of reducing the former and increasing the latter to the proper and precise dimensions. This latter comparison is the more exact one to draw; for the essential lowest octave of the Swell, or the equally essential upper octave of the Pedal Organ have been but too often omitted, where the one or the other might have been introduced but for the unessential notes from BB to GG on the Great Organ. It is believed there could be but one opinion as to the most correct course to pursue in regard to the stringed instruments; and it would seem surprising there should be a second one against an equally consistent proportioning of the different departments of an Organ.

884. It may be mentioned, by the way, that although the "Viols" of former times had *six* strings, and the modern violins have but *four*, yet the latter have always ranked as the *more perfect* instruments; while the advancement in the composition of music for string instruments, as well as of the playing on them, date from the time of the general adoption of the instrument having *fewer* strings. The parallel holds good, in every respect, in regard to Organs and Organ-playing in England.

885. The advocates for the long and for the short Manuals appear to be agreed on one very important point, namely, that the 16-feet range is the most correct one for as many of the Organ *Stops* as possible; the point of difference between them being as to where the large Pipes should be planted, whether on the Manuals or on the Pedal.

886. In Germany, also, the CCC or 16-feet range is viewed as the most correct one for the Organ *Stops*, even more generally so than in England, but not for the Organ *Manuals*. The *Pedal* is justly considered as the only proper place for their *Bass*. This is conclusively shown in German Specifications, where may frequently be seen disposed to a "Principal 8 feet" on the Manual, a "Principal-*bass* 16 feet" on the Pedal;—to the "Octave 4 feet" on the Manual, an "Octave-*bass* 8 feet" on the Pedal;—to the "Flote 4 feet" on the Manual, a "Flote-*bass* 8 feet" on the Pedal;—to a "Quint $5\frac{1}{3}$ feet" on the Manual, a "Quinten-*bass* of $10\frac{2}{3}$ feet" on the Pedal;—and so on. A reference to the German Specifications in the Appendix—taken either

from German Organ-books, or copied from the Stop-labels themselves—will fully illustrate this fact.

How the CC Manual compass was first exceeded.

887. The question here suggests itself how the CC compass ever came to be exceeded. The Manual range of the Organs built immediately after the Restoration, generally consisted of four octaves, from CC to c^3 in alt. (See Dr. Burney's article on the Organ before referred to.) The Double Diapason at that time was scarcely known in this country, and was certainly not appreciated; the Pedal Organ was entirely unknown; so that the English instruments of the date in question lacked those deep and sonorous tones which render an Organ so peculiarly well adapted to its place in the Church, and so superior to all other instruments for religious purposes. In proceeding to supply the existing deficiencies, without regarding either of the two systematic causes that were open for adoption, the third and only remaining mode of doing so was by extending the Manual downwards. Two notes were therefore added; one, sounding AA, placed on the CC sharp key; and the other, giving GG, on an additional key placed next beyond the CC one. A Manual of this kind is now called a "short octave" Manual; to distinguish it from the still longer ones that are to be met with. The result of this experiment being favorable *as to the effect*, the intermediate semitones from CC to GG were applied (excepting perhaps the GG sharp); and thus the GG long octave Manual Organ was formed. Further extensions were subsequently made; first to FFF, then to CCC. It is now, however, admitted by the great majority of English organists, that these added keys do not so properly belong to the Manual as to the Pedal; and that no sufficient grounds exist for introducing them as adjuncts to the former-mentioned departments in new work. It is not considered a sufficient reason for so doing, that the Manuals were made to GG in our fathers' time. Besides, if the key at which the Manual ought to stop is still to be passed—if the rules which should keep its compass within proper bounds are to be disregarded,—there then exists nothing to prevent the introduction of a GGG or even a CCCC Manual, if individual taste should desire it. Such an extension would be but carrying out, to the extent of a second octave, the elongating principle, which many would advocate to the extent of one octave, and which, moreover, would be equally justifiable on the same ground of individual fancy.

888. That the CC is the only true Manual compass, would not then seem to be so much a matter of individual opinion (as must be the supposition on behalf of any other), as a self-manifesting fact—all Church Music clearly showing it to be so. That it is also the only one that facilitates the perfecting of the range and proportionate development of the other departments, by avoiding an undue outlay on the Chief Manual Organ, is also beyond a doubt. Under all these circumstances, independently of others about to be mentioned, the CC compass is the only one that can be suggested with confidence for adoption as the best for the Manuals of new Organs.

The confusion in the size of the Stops caused by their elongation.

889. But there is a disadvantage in lengthening out the Manual Stops that has not as yet been hinted at; and one, moreover, that seems to be always overlooked by the promoters

of long Manuals; namely, the confusion into which such elongation throws the question of the standard length and the literal pitch of the Stops. It must have been observed, that in much Organ music, to save specifying any particular Stop that the instrument might or might not contain, the direction given is often simply an open one; as, for instance, "one 8-feet Stop;" meaning, of course, thereby, a Unison Stop. Now, by extending the compass of the Stops downwards, their size is altered; and so great is the confusion caused in consequence, that many of the lengthened Stops on a GG, FFF, or CCC Organ are made to assume a size identical with that of certain other Stops, correctly ranged, to which they are quite opposed, either in nature and method of usage, or both; and which ambiguity is eminently calculated to throw those who are desirous of identifying the size and pitch with the use of the Stops, into the greatest doubt and perplexity. For example—an Open Diapason would be of 8-feet length on a CC Manual. On a FFF Manual, the *Quint* would be the Stop of that size; and on one of the CCC compass, the *Principal.* If, therefore, an 8-feet Stop were really to be drawn as directed, it would in the first case produce the right effect, but in the second would sound the music a fifth higher than written; and in the third, the octave above. Again, in the instance of a GG Organ, the Diapason and Principal ($10\frac{2}{3}$ and $5\frac{1}{3}$ feet), which should be freely available for the majority of combinations, and understood to be so, are, from their altered size, made to be identical in measurement with the Quints of better-arranged Organs; while the Twelfth and Larigot of a FFF Organ (4 and 2 feet), which require to be used with much care, are by the same process made to correspond in size with the Principal and Fifteenth of a CC Organ, which are scarcely at all restricted in their use. In fact, the size of the Unison, Octave, and Mutation Stops are mixed, crossed, and inextricably confused together.

390. But it might be suggested, if the confusion of lengths could somehow be got over (which of course it cannot), and the Manuals were to be extended down to CCC, whether then there would not result a satisfactory substitute for a proper Pedal Organ; and one moreover that would offer great conveniences for the purpose of Duet-playing. In one sense it would; but at the same time new difficulties would be created. What is required of an efficient Pedal Organ, is not simply a Bass to the Great Manual Stops, neither more nor less; but a Pedal Bass to as many of the leading Stops of *all* the Manuals as circumstances will permit; with the addition of such others as will stamp that department with a character of individuality. All these ends can never be attained by extending the compass of the Great Organ even to CCC.

391. And with respect to the conveniences for Duet-playing, a principle of Organ-building that takes two performers to produce the effect that one could manage under proper circumstances, can scarcely be said to be an advantageous one.

392. Again, if the Manual Unison Stops be increased to the 16-feet size, the Doubles will become 32; and 32 being then the Unison size for the Pedal, the Doubles will be 64 feet in length. The full development of a long Manual Organ would demand the introduction of Pipes nearly the height and bulk of factory chimneys, which would be destitute of definite tone when made.

393. In suggesting the adoption of the CC compass for the Manual, it will not of course be supposed that discontinuing the Manuals at that key will, alone and of

itself, render an Organ a better and a more perfect instrument. It is nothing more than one necessary step towards a successful issue. Two of the most prominent faults of the long Manual systems are—they allot *too much* to certain Manuals, and *too little* to the Pedal; *both* of which faults require correcting. But if the 16-feet octave, or even a portion of it, be omitted from the Manual, and *nothing* be added to the Pedal by way of compensation, then the Organ is left practically less efficient than it was before, in spite of the theoretical corrections. This is because the "Bass" of the Stops, instead of being simply transferred from the Manual to the Pedal, is omitted altogether; giving strong ground to justify the opinion of the promoters of the long Manual systems, that "shortening the Manual compass is going backwards." The *minimum* number of "Pedal Basses" which a CC Organ should have, is *one third* as many as there are Stops in the Great Organ. The *maximum* number is one third as many Pedal Basses as there are Stops in the entire Manual Organs. Below the former proportion the Pedal Stops are never reduced in Continental Organs of pretension. (See Foreign Specifications, in the Appendix; also the works of Töpfer, Kützing, Seidel, Schlimbach, &c.) These observations, however, are not intended to qualify in the slightest manner the ample proofs already adduced of the great superiority of the CC Organ, when consistently carried out. As compared with it, the inferior and patchy Pedal effect of the GG Organ is only equalled by a second unsuccessful imitation, also peculiar to long Manual Organs, namely, that of mimicking the effect of a 16-feet Stop, by coupling the Choir Organ to the Great in the octave below. Such expedients in co-existing Organs that have only been partially remodelled, offer no satisfactory precedents for their adoption in new work.

The upward range of the Manuals.

894. With regard to the upward range of the Manuals, Organ Music very seldom ascends beyond c^3 in alt; while the Psalm Tunes and Chants, of course, do not reach any thing like so high: but, as the Pipes to the keys above that c^3 are small, do not occupy much room, and cost but little, and moreover are very useful in a variety of ways, particularly where there are octave couplers, the Manuals are generally continued up to f^3 in alt, a^3 in altissimo, or even to c^4 in altissimo. This latter range is in some respects desirable for Concert-room Organs.

CHAPTER XXXI.

OF THE PEDALS AND PEDAL ORGAN; THEIR GRADUAL INTRODUCTION INTO ENGLAND; AND THEIR CORRECT COMPASS.

895. AMONG the most important additions and improvements that have been made to the Organ in modern times in England, are to be classed the introduction of Pedals, and the establishment and subsequent development of the Pedal Organ. These features, the importance and utility of which have for *centuries* been appreciated so justly on the Continent that a place has been assigned to them in every instrument of even moderate pretensions, are even now only just beginning to be adequately valued in this country. Yet, as *Forkel* observes, in his life of *Bach*, page 99, "the Pedal is an essential part of the Organ: by this alone it is exalted above all other instruments; for its magnificence, grandeur, and majesty depend upon it. Without the Pedal, this great instrument is no longer great: it approaches those little Organs called in Germany *Positivs*, which are of no value in the eyes of competent judges."

896. A few particulars concerning the date, compass, and number of Stops found in some early Continental Pedals, may be of use, as showing at how early a date an independent Pedal was appreciated abroad.

NAME OF PLACE.	DATE.	NUMBER OF STOPS.	COMPASS.	NO. IN FOREIGN SPECIFICATIONS.
Amiens Cathedral	1429	7		14
Constance Cathedral	1518	8	CCC to Gamut G	115
Freiburg in Breisgau	1520	4	CCC to CC	37
St. Peter's, Hamburgh, earlier than	1548	13, including 2 of 32 feet		69
Rouen	1630	8	CCC to tenor e	17
Lucerne Cathedral	1651	13, including 1 of 32 feet, and 5 of 16 feet	CCC to tenor e, short	114
St. Nicholas, Hamburgh	1686	16, including 2 of 32 feet		68

897. As to the precise period when Pedals were introduced into this country, great uncertainty prevails. According to an autograph letter, written by the late Charles Wesley, and now in the possession of Dr. Rimbault, the Savoy Organ, by Snetzler, was the first that had the important adjuncts in question, and which

formed part of Snetzler's original work. Another account states the Organ in St. Matthew's Church, Friday Street, to have been the first to have Pedals; and, further, that they were of two octaves in compass; were of CCC range; had a complete set of Stopped Diapason Pipes of 16-feet tone attached; and were made in 1790, under the direction of the late Rev. Mr. Latrobe. A third account is, that the first Pedals made in England were those applied to the Organ in Westminster Abbey, by Avery; that they were a *ninth* in compass, GG to Gamut A, with an octave of unison Open Pedal-pipes attached; that they were such a novelty and curiosity that people used to go from far and near to hear and see them; and that Dr. Benjamin Cooke, who died in 1793, composed his fine Service in G for the opening of the instrument, after receiving those additions.

898. Let which of the above accounts be right that may, one fact is certain, namely, that the range of the Pedal-board and Pedal-organ—like that of the Manual and *its* Organ—have in England been subject to great diversification. In seeking to form a governing opinion on this subject, i. e. of the correct Pedal compass, the surest course will be to enquire for what end the Pedal is introduced into the Organ; and take, as a guide, the answer this question will elicit. The primary object, then, is to enable the Organist to play the Bass part of any Church Composition with his feet*, so that the necessity may be obviated of his deserting the Tenor and perhaps other inner parts; to which, it is scarcely necessary to say, his left hand should be chiefly devoted†.

899. In Germany, Holland, &c. where the true principles of Organ-construction and Organ-playing are more generally understood and appreciated than was the case till lately in England, the question concerning the compass necessary for the Pedal-clavier and Organ has long been set at rest; whereas in this country no attention at all commensurate with the importance of the subject was bestowed upon it, either by Organists or Organ-builders, until within the last few years; but the Pedals were made to accord with the incorrect GG Manuals.

900. But as music had to be more or less altered and injured to suit such Pedals, a proper spirit of enquiry was awakened; the contents of the English and German Sacred musical storehouses were diligently consulted; and from those unimpeachable sources a solution was obtained to the problem, "What is the proper compass for the Pedal?" The result of these examinations was the decision, that, to be competent to their purposes, a Pedal-clavier and Organ should possess a range of from 27 to 30 keys and tones, commencing at CCC, and ascending to Tenor d, e, or f.

901. This CCC scale has accordingly been almost uniformly adopted in England during the last few years. Occasionally only has the old GG range been adhered to. As, however, the latter still finds favor at times, it is necessary to set forth on what

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* *Bach* "produced with the Pedal, not only the lower notes, or those for which common Organists use the little finger of the left hand; but he played a real Bass melody with his feet." —*Forkel's* life of *Bach*, p. 33.

† The Tenor was formerly the Canto Fermo, Plain-Song, or principal part in a composition, and derived the name of Tenor from the Latin word *tenuo*, *I hold;* because it held or sustained the air, point, substance, or meaning of the whole *Cantus;* and every part superadded to it was considered but as its auxiliary. In *Tallis's* Responses, the Plain-Song is preserved in the Tenor.

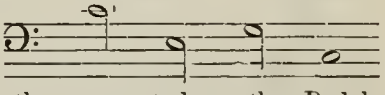
substantial grounds it is considered wholly unsuitable to the present advanced state of Organ-playing in this country.

The insufficiency and incorrectness of GG Pedals for practical purposes.

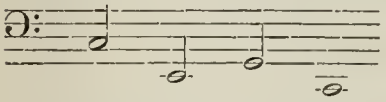
902. The first disadvantage attendant on a GG Pedal-board, is, that a very large proportion of the Music written expressly for the Church cannot be correctly played thereon. Even many of the little pieces in the instruction books of *Rink*, *Hesse*, &c. are beyond their capabilities. In fact, Pedals which descend no lower than GG are precisely in the same imperfect state that a violoncello would be without its fourth string, that is, also descending only to G; and the straits to which a violoncellist would be reduced by such a curtailment of the proper compass of his instrument, may well be adduced to faithfully illustrate the difficulties which an organist, who desires to play correctly, has to contend with when performing on Pedals so incomplete in their downward range.

The wrong pitch in which GG Pedals execute on the Manual Stops such passages as do come within their range.

903. In such case, even passages which actually lie within their compass are not sounded in the right pitch on the Manual Stops. It is the true nature of a Manual Unison Stop to produce sounds in *exact accordance* with the notes written; whether the keys be pressed down with the fingers, or drawn down by the Pedals: but this, usually, is what is *not* the case on GG Organs. For instance, if some simple progression, such as the following,



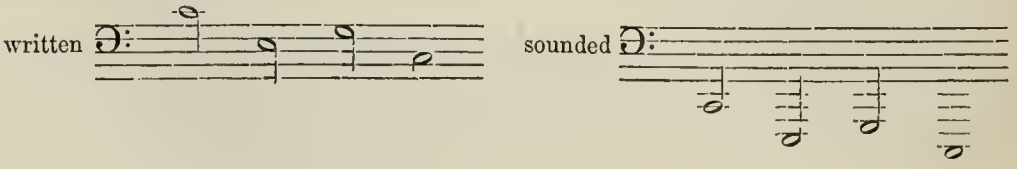
be played first on the Manual Unison Stops, and then repeated on the Pedals coupled thereto; instead of the same sounds being produced, we have the following—



In fact, we find this singular confusion of "size" and "sound" presented by a GG Open Diapason:—while the Stop itself is of $10\frac{2}{3}$ feet standard length, its pitch will be of 8 feet, if played with the hands, and of 16 if played with the feet.

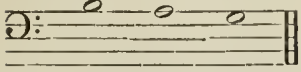
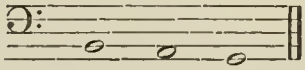
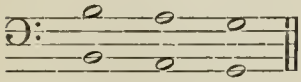
The impossibility of satisfactorily writing CCC Pipes to GG Pedals; and the false pitch in which the Pipes sound when they are so united.

904. The second disadvantage attendant on a GG Pedal-board consists in the impossibility of satisfactorily attaching thereunto an octave of Pipes having CCC for their lowest sound. The Pedals do not extend low enough to admit of the Pipes being applied to the right keys; hence they are made to act on the only perfect C octave which the Pedals do present, namely, the octave above. But, in applying them in this manner, the Pipes undergo transposition, which materially alters their nature. Instead of forming the *lowest* octave of a 16-feet Stop, they then constitute the *upper* octave of a 32-feet Stop, and produce a sound *two* octaves lower than the notation, thus—

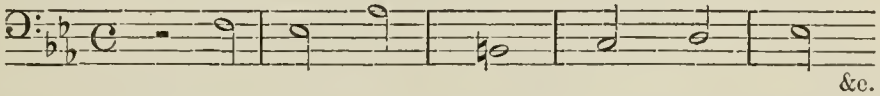


905. The incorrect Manuals suggest wrong Pedals; and the wrong Pedals necessitate a defective application of the "CCC Pedal Pipes." The Pipes being attached to the Pedals in the manner just noticed, the remaining half-octave of Pedals (i. e. the five treadles from BB down to GG) are either made to communicate with the same Pipes as their octave above, or they are furnished with Pipes in unison therewith; the result in either case being virtually the same. A "return" or "repeat" is caused in the series of Pedal sounds, which leads to this singular anomaly,—that the Pipe which produces the *lowest* sound is attached to one of the *middle* Pedals, while another that gives one of the *medium* sounds is made to act on the *lowest* Pedal.

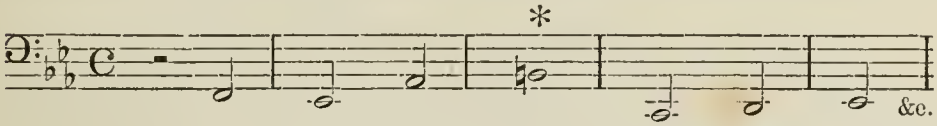
The false readings which the CCC Pedal Pipes create.

906. The third disadvantage attendant on a GG Pedal-board arises from the compulsory attachment of the CCC Pipes to the wrong octave of Pedal keys, and the consequent "return" that takes place on the half-octave of keys below. By this "return Pedal Pipe system" the two G, G sharp, A, A sharp, and B Pedals are made to produce precisely the same sounds; so that whether the upper half-octave of Pedals be used  or the lower,  or both together,  no contrast or relief of any kind can be gained. The consequence of this identity in the sound produced from both ends of the GG Pedal-board, is, that such musical progressions as can be played on the treadles are altered, transposed, and reversed in their sounds, in the most remarkable manner; often producing effects of the most startling and painful description. A few illustrations of this fact will now be given.

907. The first is taken from the well-known Chorus in *Handel's* MESSIAH, "*And with his stripes.*" The subject, on its first entry in the Bass, stands thus in the score:

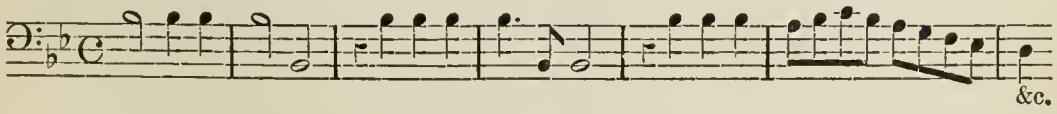


908. On "Return Pedal Pipes" it is given in the following form:—

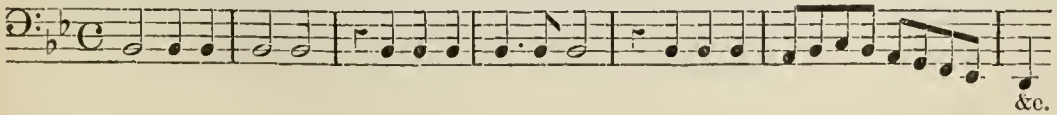


the subject being, in a musical sense, destroyed by the "return," marked by an asterisk, and a grammatical error of the worst description introduced.

909. The next illustration is the subject of the concluding Chorus in Mozart's Litany:

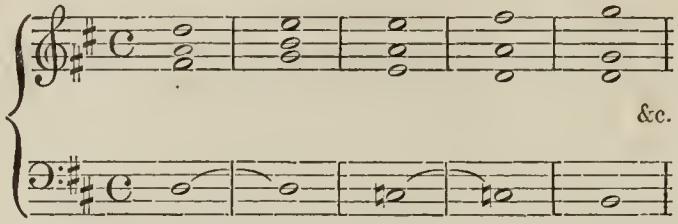


910. The above—one of the most dignified and pompous subjects ever written—is thus altered by the "Return Pedal Pipes:"

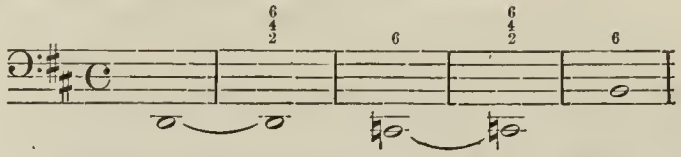


911. The reading conveyed of the first five bars of this subject, then consists of a tame and monotonous reiteration of a single note.

912. The following few chords exhibit the progress of the harmony in the opening phrase of the introductory symphony to *Handel's* Coronation Anthem, "*Zadok the Priest:*"

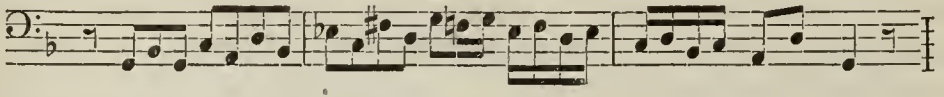


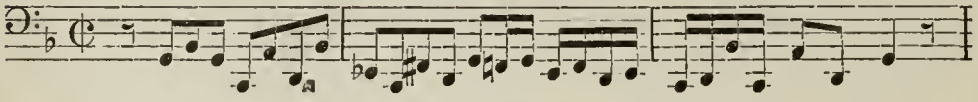
and the following notes show the very objectional form the resolution of the seventh in the Bass is made to take by the Return Pedal Pipes:

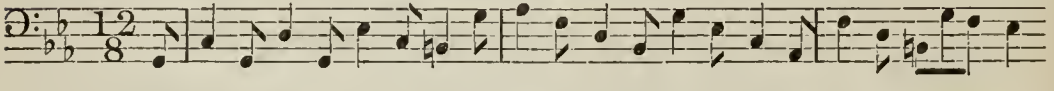


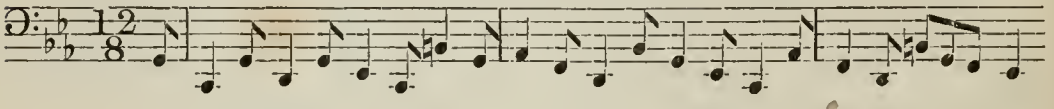
913. The foregoing selections are from works written for Voices and Instruments. The two following are subjects from strict Organ compositions.

914. No. 1 is taken from *Bach's* well-known Fugue on the German Chorale, "*Wir glauben all' au einen Gott,*" and which stands thus in the composition itself:



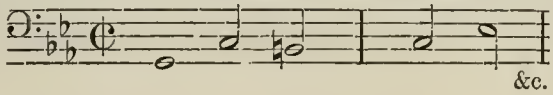
915. This is given out in the following form on the Return Pedal Pipes:

916. The next is from *Mendelssohn's* Fugue in C Minor:



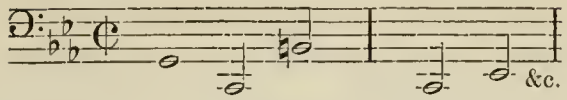
917. The Pedal Pipes give the following version of the above:

918. It would scarcely be possible to recognize either of the foregoing subjects when played on the Pedal Pipes alone; for the original order and nature of the intervals from note to note are so frequently altered, that but few vestiges of the original progression remain.

919. Here are two of the simplest subjects that are to be found in the whole range of our standard Choral works for the Church:

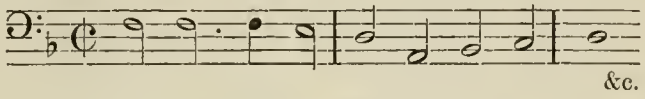
Opening subject of the Anthem, "I will exalt thee," by *Dr. Tye.*



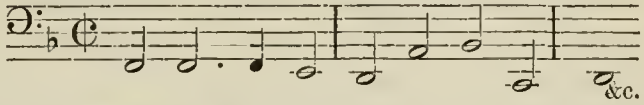
As given on a Return Pedal Organ :



Opening subject of the Anthem, "Almighty and everlasting God," by *Orlando Gibbons :*



Subject as given by a Return Pedal Organ :



920. The list of examples of false reading rendered unavoidable by the principle of Organ-construction already adverted to, might be increased *ad infinitum;* but this must be needless. The above specimens will be sufficient to show how defective is the GG Pedal and "Double Pedal Pipe" system. For Concert-room Organs it is absolutely worthless.

The introduction of "Double Pedal Pipes" as the first Pedal Stop, not in accordance with the laws of Organ-building.

921. But, independently of violating the rules of the Grammar of Music when they are being used, the "Double Pedal Pipes," by their introduction as the first Stop on the Pedal, involve a departure from the very rudiments of Organ-building; one of which is, that the Unison Stops of each Clavier, as being the most important, should be *first* introduced. Others are, (1) that the sound of the Unison Stops should predominate; and (2) that the first Stops proposed for the Pedal, should be the Bass to some of the Manual Stops. That it must be impossible for the Organ-builder to balance the tone of his instrument properly, if the most important Pedal Stops—the 16-feet—are designed to be omitted, and another—the *Double*—which should be subservient, is to be introduced, is self-evident. Moreover, the Specification itself presents great want of unity and clearness of design, when the "Double" is the only Stop proposed for the Pedal, and yet is the Stop that is excluded from perhaps all the Manuals, as is generally the case with GG Organs.

922. It might be urged that the above important omission from the Pedal is very well supplied by coupling the Manuals thereto in such a manner as to obtain a 16-feet pitch from the elongated Stops of those departments, so far as their compass will permit. This, however, is not really the case; for, instead of the scale of the single Pedal Stop being so deduced from that of the borrowed Unison as to secure the predominance of the tone of the latter, it is generally so much larger, and the power and density of its sound so much greater, that it cannot be reduced into proper proportion, even if the Diapasons of all three Manuals are coupled together and brought to bear against it.

923. In fact, after carefully considering what are the characteristics of a GG Organ, with Pedals of the same compass and Return Pedal Pipes, and ascertaining its theoretical and practical defects, it scarcely becomes a subject of wonder that such a system (or rather no system) should be considered unworthy of perpetuation in the present day.

924. For, in the first place, it is as necessary to have the Bass part of a Composition played in an intelligible and correct manner as any other—more particularly as Part-singing, and consequently Part-playing, is now more often encouraged and appreciated in the English Church than it used to be; and in the next, on an instrument so defective in the main points we have described, the greater part of the Music of the Church can either not be played at all, or without due effect; as is well known to many Organists whose misfortune it is to have so unequally arranged an Organ whereon to play. Even the very name "Pedal Pipes," as applied to the single Half-Stop on the Pedal of a GG Organ, is devoid of definiteness and intelligibility. From such a name it cannot be gathered whether a Stop, so called, sounds in unison with the Manual Diapasons, or whether it gives the octave below; or if it does neither the one nor the other in particular, but partly both. Neither can it be discovered whether its Pipes are made of wood, or of metal, or whether they are Open or Stopped. Then of the Scale; the CCC Pipe will in some instances be scarcely 10 inches deep; while in others it will be 20 inches—that is to say, there will be a greater difference than between the Dulciana and Open Diapason on the Manuals—yet there will be nothing whatever in the name or labelling to announce this difference. All these varieties of pitch, material, scale, and structure, are alike to be met with under the one indefinite term "Pedal Pipes."

The premature introduction of Double Pedal Pipes often a hindrance to the introduction of more important Pedal Stops.

925. Besides the defects above enumerated which they bring with them, the premature introduction of Double Pedal Pipes is an injudicious step on other grounds. They are often the means of preventing the subsequent introduction of the more important Unison Pedal Stops, on account of the false impression which they convey of the "size" of the instrument of which they form a part. Instances might be cited, where an Organist has represented to the authorities the imperfect state of his instrument; and has been told, in reply, that the Organ is "too large" or "too loud" already; and this too when there has been but half a Swell, no Choir Organ, and no Open Diapason, Stopped Diapason, &c. on the Pedal. Nor is such an answer made without some justification, although founded on a serious misconception. Those who have had neither the requisite leisure nor opportunity to make themselves acquainted with the technical details and practical working of an Organ, can only speak of the instrument from the effect which it produces on them in the Church; and an octave of Pedal *Pipes* (in a small Organ), sounding *two* octaves below the corresponding octave of the Bass voice, of a larger scale than those forming any other Stop in the Organ, and often supplied with a wind of extra strength, are just the very things to betray one who so forms his judgment into a wrong conclusion. Their tone, standing apart (as it must do under such circumstances) from the remainder of the instrument, arrests the attention of the auditor; who, erroneously taking that as a sample of the sound of all Pedal Stops, feels opposed to the introduction of the latter. It may seem paradoxical to those who are not sufficiently masters of the subject to be aware of its perfect truth, that an Organ will possess more adequate means for being played soft, if the *one* octave of Pedal *Pipes* be omitted, and some three or four complete Pedal *Stops* be introduced; but such is nevertheless the fact. It is constantly the case in accompanying Church

Music, that a soft Pedal Unison Bass (that is, one of 16-feet pitch) is the only appropriate Bass, while one of a heavier and deeper tone is quite opposed to the purpose; yet when, instead of some of these most important Pedal Stops, there are only the "Double Pedal Pipes" at command, the Organist has no alternative but either to use those, in spite of their manifest inappropriateness, or none at all; and with the certain prospect of missing the true effect, do which he may, and perhaps of being held responsible afterwards for the result. What has been here advanced in relation to Church Organs, applies with even greater force to Concert Hall Organs.

The arrangements of a CC Organ contrast favorably with those of GG compass.

926. How strongly do the simple, systematic, and most excellent arrangements of the Pedal of a genuine CC Organ contrast with the complicated, faulty, and incomplete attributes of the GG plan—many of the particulars of which have just been detailed! For instance, on a correctly planned CC Organ, the Bass part of any piece of Church Music can be executed on the Pedals in all its integrity, let the instrument be ever so small. In the next place, music that is played thereon, with the Manuals coupled thereto, is not only sounded in the correct pitch, but is also given in *octaves*, consisting of the actual sounds represented by the notation, with the addition of the octave below, as would be the case in Duet-playing on a CCC Manual Organ. The most skilful left-hand would fail to play passages in octaves on a long-Manual key-board, which can be executed with ease on a properly arranged CC Organ. The *Manual* Unison Stops (8 feet) give the various progressions as they stand (just as Bass voices or violoncellos would), while the *Pedal* Unison Stops (16 feet) give it as faithfully in the octave below; that is, in the pitch corresponding with that of the Double Basses;—so happily does an artistically planned Organ facilitate, and render comparatively easy, the perfect execution of music of the highest and most difficult class.

927. It should be the aim, then, of those to whom is entrusted the task of designing an Organ (if it really be desired that the instrument shall be as applicable and adequate to all its purposes as circumstances will permit, and be worthy of recognition as a work of art when completed), to eschew all plans that involve the violation of those rules and principles of which every Organ-builder and Organist is naturally supposed to be an upholder. All attempts to produce an artistic instrument will prove futile, unless the stunted GG Pedal-board and the imperfect and defective 32-feet Stop be given up; and in their lieu, a CCC set of Pedals, and at least one intelligible Stop of 16-feet pitch, be substituted. In Organs even of the most diminutive kind, this is quite attainable. A Covered Stop of that size of tone might, in extreme cases, be disposed on the Pedals; in moderate-sized Organs, two or three 16-feet Stops should be introduced. In instruments of larger dimensions, a 32-feet *sounding* Stop may be added; and in those of the first magnitude (*and in those* ONLY), should a 32-feet Open Stop appear. The 32-feet Stop, therefore, is one of the *last*, instead of the *very first*, to be proposed. The rules which regulate the admission of these and smaller Pedal Stops is a subject for separate consideration.

928. It need only be added here, that the CC Manual key should be capable of being united to the CCC Pedal; the Tenor c to the CC Pedal; and the middle c^1 key to the Tenor c Pedal. The intermediate Manual notes would of course be at-

tached to the respectively positioned Pedals*. Thus would be secured the presence and union of the 8 and 16 feet scales, even in an instrument of the most prescribed limits.

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* In adding C Pedals to a long octave Manual Organ, it would be necessary—to prevent the notes below CC from becoming useless—to have *two* Pedal Couplers; one of the kind above recommended, and another to unite the GG Manual note to the GG Pedal, and so on. In many existing cases, where there are CCC Pedals and GG Manuals, the Pedals from CCC to FFF take down the Manual keys from CC to FF, and then the GG Pedal draws down GG on the Manual. This creates a *second* return.

CHAPTER XXXII.

THE SITUATION FOR THE ORGAN.

929. The next subject for consideration—the situation for the Organ—is of no less importance than those already discussed; since on it depends, in a great measure, the best effect of the instrument when it is finished. So great an influence, indeed, does this question of position exercise, that an inferior Organ favorably situated will sound better than a superior one that is unfortunately placed; and a weak-toned instrument in a good position will sound louder than a fuller-toned one in an unfavorable situation.

Acoustical facts to be consulted.

930. Before, however, entering upon the enquiry as to which are good situations and which are not, it may not be unimportant to mention certain facts connected with the production and propagation, the absorption and weakening of sound; as a recollection of these will materially assist in illustrating the relative excellence or otherwise of the several sites that will have to be brought under notice.

How sound is produced and propagated.

931. "When bodies are brought into sudden contact," says the author of the volume entitled 'The art of improving the Voice and Ear,' "or a single body is made to vibrate or expand suddenly, it must displace a quantity of the surrounding air. The air which is thus displaced, in its turn displaces that portion of air which is next to it or beyond it on every side, above and below, before and behind, on the right and on the left. This displaced portion of air displaces again what is beyond it, and so on, in a manner similar to the circles of water which arise from throwing a stone into a pond. In the case of sound, however, the waves are not in *superficial* circles, but in *spheres*, like the coats of an onion." Sound, then, travelling, as it does, in all directions, it is easy to discover the cause of the excellent musical effect produced by Organs occupying a *central* position in a building; as, for instance, the Choir screen of a Cathedral or other large cruciform Church.

How brief sounds disperse.

932. A sound that is only an instant in duration, does not spread like a flood of water, pervading every part over which it passes; but, like a ripple made in a lake, which leaves in repose the part that it has quitted. This may be ascertained by striking a full staccato chord on a Cathedral

Organ that occupies a central position, when the sound will be distinctly perceived retiring from the instrument to the remotest parts of the building, gradually lessening in power, and ultimately dying away.

How sustained sounds more completely occupy space.

933. A continuous sound, on the contrary, pervades the entire space through which it has travelled; because fresh sound-waves are constantly being engendered, which successively occupy the space the preceding ones have left. This is the reason that the first sound of a sustained chord on a Cathedral Organ is *not* heard receding. The greater strength of the sound-waves nearer the instrument, from being less spent by divergence, prevents the original sound being heard. On raising the hands, however, from the keys, the sound will again be heard fading away.

The distribution of a sound that cannot travel backwards.

934. A sound that is produced in such a situation that it cannot travel backwards, on account of there being a large reflecting surface to check its progress in that direction, as in the example of an Organ placed at the west end of a church, spreads somewhat after the manner of the rays of light through the bull's eye of a lantern. It travels forwards and sideways, upwards and downwards, and spreads as it proceeds. It is also reflected forwards by the surface behind; and derives some accession of strength from being so reflected. Sound, however, being greatly more reflexible than light, it spreads more rapidly, makes its way into recesses, round columns, and passes great walls or corners of buildings, where the solid interpositions would, in the example of light, only cast shadows.

935. An illustration of the fact of sound spreading as it proceeds may easily be found in a galleried Church having the Organ at the west end. The tone of the instrument is the most completely "caught," *not* by stationing oneself immediately inside the door, at the side of the Organ, leading into one of those appendages; but by traversing the gallery some little distance. In a similar manner an illustration of the fact of sound descending as it progresses, is given in the circumstance of an auditor in the nave having to place himself at some little distance from the instrument to hear it to the greatest advantage; and in his having to increase that distance in proportion to the elevation of the Organ above the ground.

936. The extent to which the sound of a west-end Organ is strengthened, by reflection from the surface behind, does not meet with a familiar illustration in a Church that has the instrument so situated; but in those Cathedrals wherein the Organ occupies a central position, a good example is presented by the effect of the "Choir Organ in front;" the tone of which sounds strong in the Choir, into which part it is directly reflected by the Great Organ case behind; but which sounds weak outside the Choir, on account of the Great Organ case standing between the Choir Organ and the auditor, and therefore presenting an interposition to the tone travelling in that direction. The extent to which the Great Organ case assists the tone of the Choir Organ in its forward progress into the Choir, and checks its backward course into the nave, are points that received distinct illustration in St. Paul's Cathedral during the present year (1854), on the occasions of the Sunday Morning Service being celebrated in the Choir of the Church, and the afternoon under the dome. In the

fore-mentioned part of the building, the tone of the Choir Organ, as far as the Principal—reflected as above—sounded louder, and afforded more support to the vocal Choir, than did the same Stops, with the Twelfth and Fifteenth added—impeded as above—when the singers sat outside the Choir. Another proof, though of a negative kind, of the extent to which a sound is strengthened by reflection, is afforded by the circumstance of its being so much weakened by the removal of the reflecting surface from behind. An illustration of this fact was given at Westminster Abbey, when the Great Organ was removed from the centre of the screen; which alteration, allowing more of the tone of the Choir Organ to travel backwards into the nave, caused it to appear more "faded" in the Choir.

Sound weakened by divergence.

937. As the rays of light would become more faint as they proceed and diverge, so sound becomes weaker the farther it travels and the more it disperses. "Whenever," says Dr. Brewer, in his work on the 'Phenomena of Sound,' "sound can diffuse itself freely round its centre of propagation, it loses in *intensity* what it gains in *extent*;" consequently, a sound that has travelled *twice* a certain distance, will only be heard with *one-fourth* its original strength; the loudness not diminishing inversely as the distance increases, but inversely to the *square* of that distance. This is the case in the open air; but in a building—as a church or a concert-room—the walls and roof limit the extent of the divergence of the sound, and prevent its fading away so rapidly. Moreover, after the sound has struck against them, and is checked by them, it is by them reflected back; and if the original sound has ceased, the reflected sound forms an echo; but if it continues, the latter mingles with the former, and enriches and strengthens it.

Echo.

938. When the return of the sound is perceptible to the ear, it is termed an echo. A certain time, however, must elapse between the production of the sound and its being reflected, or no echo will be perceived; and that time must be at least the twelfth part of a second, within which interval the ear is incapable of receiving separate impressions. The distance of the reflecting surface, therefore, must be at least forty-seven feet from the place whence the sound emanates to cause an echo. Echo, then, is caused by the reflection of sound from distant surfaces.

Resonance.

939. But the strength and quality of a musical sound are much increased and improved by the reciprocation of bodies in the more immediate neighbourhood whence the first sound emanates. Thus the vibrations of a tuning-fork will, on the tip of the handle of the fork being placed on a table, acquire a marked accession of strength. This augmentation of sound is due to *resonance*. The sonorous vibrations created by the tuning-fork, set the wood upon which it is placed in a similar state of excitation; the simultaneous vibrations of which being communicated to the superincumbent air, greatly increase the strength of the original sound. The front, back, sound-post, and all the air contained in the body of a double-bass or violin, in like manner contribute to produce the volume of tone elicited from the instrument, by vibrating in unison with the strings and with each other. If only the *strings* vibrated, the sound would be comparatively insigni-

ficant; but when the entire body of the instrument is set in motion, the impulse is sufficient to produce sounds of considerable power.

940. A sound thus increased and enriched is capable of further augmentation and improvement from resonance, if it is produced under circumstances favorable to the extension of that influence. The tone of a double-bass, for instance, is much increased in power by the instrument resting on a hollow platform—as the reciprocating floor of a concert-room orchestra. "The platform receives from the musical instrument a vibratory motion, imparts the same to the air between it and the floor of the building, and the whole combined gives a powerful impulse to the air in the concert-room." (Dr. Brewer, page 277.)

941. These several examples illustrate precisely the effect of resonance on the tone of an Organ. The tone of an Organ is much improved by the instrument being placed on a wooden floor; and it is still more beneficially affected when that floor is a raised one. The reasons are these. The sound-board acting something after the manner of the belly of a violin; the frame-work as the sound-post; and the *wooden* floor as the back; all are thrown into a state of greater or less vibration by the sounds, which in this case are produced by pipes and not strings.

942. The vibratory motion of portions of the framework is sometimes perceptible to the touch, even when a single Stop only is being sounded on the sound-board above—as, for instance, the Stopped Diapason; while that of the floor is frequently felt by the feet, when all the Stops are in full play.

943. The air between the sound-board and the ground is also set in motion, like that in the body of a violin; and sometimes its tremulousness is sufficiently great to cause the trackers to vibrate in their registers. The tone of a large pipe, again, is much strengthened by standing on a wooden floor, even as that of a double-bass is by resting on the platform of an orchestra. This is one of the reasons why Organ-builders place their great Pedal Diapason pipes as near to, if not actually on the floor, whenever this arrangement is practicable.

944. The wooden portions of the case of an Organ, again, are frequently of essential service in increasing the resonance. It has sometimes happened that a pipe that has produced but a weak sound, has, when tried in its situation, and been assisted by the vibrations of the case, produced one of the finest notes in the instrument.

945. When the wooden floor on which an Organ stands is a raised one, the platform, together with its supports, and also the free air about the whole, are all thrown into a state of vibration, to the augmentation and improvement of the sound; and when the heavy-toned Bass pipes are being used, the vibrations of the flooring or platform are sometimes communicated to the wooden fittings of the Church, or even to the very walls of the edifice.

946. Echo and resonance, therefore, each exercise great influence on the tone of an Organ. Echo imparts to it that inexpressibly charming, etherial, lingering effect which is so perceptible in Cathedrals and other large buildings that are comparatively free from absorbents, after the actual sound has ceased. Many buildings which do not produce a *perceptible* echo, yet impart a certain buoyant, free effect to musical sounds produced within them, that is highly beneficial to the quality of their tone, as well as favorable to their distribution.

947. Resonance is the cause of the agreeable, pleasant, humming effect which is heard to come from within the Organ itself. In low, broad, galleried buildings, where but little room has been allotted to the Organ, and where the contents of the instrument have in consequence been so crowded together as to leave but little free space inside it, the resonance is much decreased; and an effect is frequently perceived as though the sound of the Organ were struggling to develop and disperse itself, in spite of the impediments with which it is beset. The effect of an instrument so constructed and situated is frequently dead and *palpable*. Instead of the many different sounds which in an Organ are concentrated on each key, mingling together, and producing the effect of one excellent whole, every "item" falls on the ear as a separate and isolated sound.

Impediments to the equal distribution of sound.

948. The most common impediments to the equal dispersion of the tone of an Organ occupying a west gallery, are the lateral galleries. These catch the sound as it spreads, and prevent its descending into and pervading the aisles beneath so effectually as it would otherwise do.

Absorbents of sound.

949. The materials and fabrics, common in Churches, that soften and deaden sound, are wool, cloth, hair, tow, matting, &c. "They shut up a large quantity of air between their minute and detached parts; so that they cannot readily transmit an impulse." (Dr. Brewer.) Cushions, hassocks, curtains, people's dresses, and matting, therefore are all absorbents of sound.

Church arrangements that are favorable to sound.

950. The exclusion of lateral galleries from modern Churches, together with their baize linings; the introduction of low open seats, in place of high closed pews; the removal of hassocks in favor of kneeling boards; and the substitution of Minton's tiles for matting up the avenues; are all favorable steps towards the preservation of the acoustical properties of the building.

Absorbents sometimes introduced to subdue excessive echo.

951. While the influences of impediments and absorbents are, generally speaking, highly detrimental in their effect, there have been instances of the latter being made to serve a beneficial purpose; as when the echo in a building has been so great as to render sounds, whether of the voice or of music, confused and indistinct. At the Chapel Royal, Whitehall, the echo was found to be so excessive, a few years ago, after the building was restored, that the clothing of an assembled congregation was insufficient to check the remarkable prolongation of sound; and crimson cloth was therefore hung, in festoons, round the building, which, not presenting a sufficiently hard surface to throw off all the tone, but, on the contrary, a sufficiently soft one to absorb some of it, produced the desired effect. At St. Paul's Cathedral, again, at the rehearsal of the music performed this year (1854) at the festival of the "Society for the Propagation of the Gospel in Foreign Parts," the semiquavers in Handel's Chorus, "Great was the company of the preachers," when played upon the Organ,

ran into each other, and produced a confused effect; but it was calculated that the clothing of the vast congregation expected to assemble under the dome, would so far lessen the echo as to render the same passages perfectly distinct, when performed in the Service, and this proved to be the case.

Velocity of sound.

952. The average rate at which sound travels in atmospheric air, is 1120 feet in a second of time; and high and low sounds, soft and loud sounds, all proceed with the same velocity. Thus the tones of the lightest Treble voice will reach the extremities of an extensive building as rapidly as those of the heaviest Bass voice; and the sounds of the most delicate Dulciana as quickly as the tone of the most ponderous Posaun. Were it otherwise, the acute and grave tones of voices, and the weak and strong-toned Stops of an Organ would be heard confusedly jarring after one another.

953. But for the same reason that the ripple caused by dropping a small pebble gently into a smooth piece of water, will not spread so far as those produced by casting a large stone into it, the sound-waves produced by a soft musical sound will not extend so far as those excited by a powerful one. Its precise strength depends, in the first instance, on the force of the shock that is imparted to the air; and which produces sound-waves of correspondingly decided character. The distance to which it will travel, depends on the extent to which the sound-waves can spread without meeting with an obstruction. When there are no impediments, and but few absorbents in their course, the sound not only reaches farther, but mellows as it progresses: when they meet with many obstructions or absorbing substances, it not only does not reach so far, but its strength is lessened and its quality impoverished.

954. The distance to which a sound will travel, depends also on its intensity, density, and perhaps gravity. A dense sound will travel farther than an intense one, as is proved by the fact of the beat of the great drum of a military band, playing in the open air, being distinctly audible at a greater distance than the united sounds of the Trombones and Ophiclides. Grave sounds also appear to travel farther than acute ones; at any rate the Open Pedal Diapasons of an Organ may be heard at a greater distance outside a Church than the higher Organ-sounds; and in like manner the tone of the double basses in an orchestra may be distinguished sooner than the treble instruments, as you approach a concert-room. The "Tenor" of a peal of bells is also frequently heard at a greater distance from a Church, or at any rate more distinctly, than the other bells.

The apparent strength of a sound, dependent on the position of the auditor, &c.

955. The *apparent* strength or weakness of a sound will depend on the relative position of the sounding body and the auditor; that is to say, whether they be near together, or far apart: and also, to a material extent, whether there be many absorbing substances between them. A sound of a given strength will sound louder at a greater distance, when the intermediate space is comparatively free, than it will at a less distance with impediments interposed;—hence, the fact mentioned at the commencement of this chapter, of the tone of an inferior Organ being improved, and of a better one being injured, by its position; the acoustic capacity of the Church; and the nature of its fittings. If the auditor is stationed below the level of the

sounding body, he will hear the sound as it diverges downwards; if he is on either side of it, he will hear it as it spreads; but if he is on the same level with it, and near to it, he will experience its full and direct force, at the same time that his clothing will present an absorbing impediment to its free progress; while, on the contrary, if he is stationed at a distance, and other persons intervene, the sound will reach him in a weakened and faded form.

956. When the amount of absorbing substance in a Church is needlessly increased, and the Organ occupies a position unfavorable to the equal distribution of its tone, the instrument will sometimes sound "too loud" in some parts of the Church, at the same time that it will appear "too soft" in others. This inequality of effect, however, is, under such circumstances, unavoidable.

Penetration of sound.

957. Sound possesses the power of penetrating and passing through hard substances; hence the circumstance of the tone of an Organ being heard so plainly outside a Church. When an Organ is placed in a chamber built out from a Church, and is accompanied by other arrangements disadvantageous to the free dispersion of its tone, it will even be heard almost as distinctly outside the building as in it. Another illustration of the penetration of sound is presented by the Swell of an Organ, the tone of which is heard perfectly well, though in a sweetly subdued form, through the thick wooden box when the shutters are perfectly closed.

958. Having noticed such phenomena connected with sound as appeared to be necessary to illustrate our present subject, we may now proceed to consider the various situations occupied by Church Organs, as well as the merits of each.

The west end of a Church, as the situation for the Organ.

959. The most usual position assigned to the Organ, in Continental Churches, for at least the last three hundred years, has been the west end.

Old examples of west end Organs in Continental Churches.

960. A few examples and dates may be cited, illustrative of this fact. The Organ in Amiens Cathedral (Foreign Specifications, No. 14), which has a 16-feet front, and was completed in 1429, originally stood and still stands at the west end. The Organ in Chartes Cathedral, built in 1513, was first erected over the great western doorway. In the Cathedral at Constance, in Switzerland, the Organ at the west end was originally erected in that situation in the year 1518, which date appears on the case of the instrument (see Specifications, No. 115). The Organ at the west end of the nave of the Cathedral at Freiburg, in Breisgau, was built in 1520 (Specifications, No. 37). At Hamburgh, the oldest Organ in the town, previous to the conflagration of 1842—in St. Peter's Church—stood at the west end, and had a 32-feet front. It was not known when or by whom it was originally built; but the last two Manuals —it had four—were made at Hartzogenbach, in Brabant, by Mister Nargenhof, in 1548, and sent to Hamburgh by sea. This, M. Pfiffer, the Organist to the church, towards the latter part of the last century, informed Dr. Burney was upon record. Again, at Lübeck, in St. Mary's Church, the Great Organ, which has lately been re-

built, is similarly situated. It is not known when it was originally built, but the Front Choir Organ, which is a *subsequent* addition, was made as long ago as the year 1561, which date is ingeniously recorded among the ornamental carving at the top. The instrument is a "hanging" Organ, with a 32-feet front of tin; and the beams which support it are built into and project from the wall behind.

961. There are three old west end Organs also still standing in Churches at Liege. That in the Church of St. Denis, which has the Choir Organ in front, bears the date of 1589 carved on the case;—the second, in St. Jaques', also with Choir in front, was built in 1600;—and the third, in St. Anthony's Church, has the date of 1624 carved and gilt on the case.

The merits of the west end, as the situation for the Organ, considered.

962. In selecting the west end of the Church as the situation for the Organ, the Ecclesiastics, Architects, Organ-builders, Organists, or whomsoever fixed on that position, no doubt gave it the preference for the same reasons which in after times led to the end of a Concert-room, being generally recognised as the best place for an orchestra;—namely, because the tone could travel "forwards, sideways, upwards, and downwards;" in fact, could be dispersed throughout the building more equally from that situation than from any other.

963. An orchestra, so placed, has the area of the entire length of the room before it; into which the sound, from the great concourse of instruments, can travel, and, in an united state, fall on the ear of the auditor. In the same manner an Organ, similarly situated in a Church, has the area of the entire length of the nave and chancel before it; into which the sound from the several pipes can travel, and, in an united and mellowed form, reach the ear of the Clergy and congregation.

964. The west end afforded sufficient space to admit of the Organ being erected on an elevated platform or gallery—as a modern orchestra is elevated above the level of an audience—whereby the resonance was increased, and additional freedom also imparted to the tone.

965. By elevating the instrument, the full force of its tone passed over, instead of overwhelming those nearest to it, into the open space before it; whence it was diffused throughout the edifice. A sound is distributed more equally from a raised position in *any* part of a Church, than from a low one; hence the necessity for a reading-desk, pulpit, and steps to the altar, to elevate the minister so that his voice may travel to the remote parts of the building.

966. The west end, at the same time that it admitted of the Organ being sufficiently elevated, presented facilities for this being done, and yet plenty of space being left between the top of the instrument and the roof of the Church; whereby the tone was still further and beneficially affected. Into this space the numerous pipes poured forth their separate sounds; which, there meeting and amalgamating, entered the Church with united and mellowed effect.

967. Had the Organ, however, been placed too near the roof, its tone would have been partially "smothered" in effect, and the instrument itself exposed to considerable injury from the excessive heat of the sun in summer (which might then often have been conducted into it through the roof), and from the cold and damp in winter. A certain amount of derangement from atmospheric change would at times

be unavoidable, as explained in a former chapter (see *ante*, page 160); but such variations would have told with much greater severity, had the Organ been placed close to the roof; where, in addition to its pipe-work being more frequently thrown out of tune by the excessive alterations of temperature, the mechanism would, by its exceeding dryness at some seasons, and dampness at others, have been rendered more subject to sticking, swelling, warping, ciphering, and many other evils of a like kind, with which casualties subsequent Organ-builders have nevertheless been compelled to become familiar, in consequence of their having to erect so many instruments in "second galleries."

968. The west end, again, generally admitted of more space being devoted to the Organ, which obviated the necessity for crowding the mechanism and the pipe-work.

969. When an Organ-builder is "cramped for room," the mechanism has often to be crammed so closely together, that, on the occurrence of some trifling fault, much additional derangement must be caused before the seat of the original failing can be arrived at. And the same with the Pipe-work; but with the additional disadvantage, that, when the Pipes are "packed too closely together," there will sometimes arise a beating or a jarring, or a weakness or unsteadiness of speech in some of the Pipes that will defy correction.

970. Another very important object attained by placing the Organ at the west end of the Church, was this. An efficient Organ was necessarily also a large one; and the larger the Organ, the greater probability of its becoming an eyesore. By erecting it, however, at the west end, it would not be within sight of, but at the *back* of the congregation; and would only be visible to its members on their turning to leave the Church.

971. The reasons, musical, acoustical, and structural, in favor of the west end, as an eligible situation for the Organ, therefore were very great.

An architectural objection to the Organ occupying the west end.

972. *Architecturally* considered, however, it was frequently open to one great objection. Most Churches had a west window; generally one of the most handsome in the building; to hide which would have been a serious sacrifice. Many Organs were therefore made, so as still to occupy the west end for the sake of the musical effect; but so that the architectural feature should not be hidden, nor the light through it excluded from the Church. Several instruments so constructed are mentioned by Dr. Burney, in his tour through Germany and Italy, the particulars of which are here extracted.

Examples of divided west-end Organs, in Continental Churches.

973. "In the town of Courtray, the Organ, at the collegiate Church of *Notre Dame*, is disposed of in a very singular manner; it is placed in a gallery at the west end of the building; but, in order to preserve the window, which was necessary to light the body of the Church, the Organ is divided in two parts, one of which is fixed on one side of the window, and one on the other; the bellows run under the window, and communicate with both parts of the instrument, which is a large one of sixteen feet, with Pedals, and seems to have been but lately erected (1772). The keys are in the middle, under the window; but not to be seen below.

974. "The Organ at the Dominicans Church, at Frankfort, has an arch cut through it, to let the light into the Church from the west window; it is in a handsome case, the ornaments over the arch are in a good taste, and the side columns are well disposed. The keys are on the right hand *side* of the instrument, over which there is a small front; the compass is from C to C, the pedals have an octave below double C.

975. "In the Cathedral at Passau, which is a very beautiful modern building, of the Corinthian order, there is a very magnificent Organ, to look at. The case is finely carved and gilt, and the pipes are highly polished: it is divided into two columns of large pipes, one on each side, and has a complete little Organ in the middle, which joins them together, and saves the west window: it is what builders call a thirty-two feet Organ. The front pipes are of burnished tin."

976. St. Michael's Church, Vienna. "This instrument has no front; the great pipes are placed, in an elegant manner, on each side of the gallery; and there is a box only in the middle, of about 4 feet square, for the keys and Stops;—so that the west window is left quite open. The compass of the Organ, in the Manuals, extends only from double E* in the bass, to C in alt; but the pedals of most German Organs have an octave lower than the lowest note of the keys that are played by the hands, which is the case with this instrument. It has forty Stops, and three sets of keys, which, by a spring of communication, can be played all together."

977. Prague. The Organ in the church of St. Nicholas "is divided into two parts, placed one on each side the gallery; and the keys, with a *positif*, or small choir Organ, are in the middle, but placed so low as to leave the west window clear: instead of wood, the framework, pillars, base, and ornaments of this instrument, in front, are of white marble."

978. To these examples may be added the Organ at Weingarten, in Suabia, which is so constructed as to admit light into the Church through six semicircular-headed windows, ranged in two rows, of three each. The Organ at the Minoreten Church, at Cologne, is also pierced with several window-like openings, to admit light from the west window into the body of the building.

Smith and Harris's Parish Church Organs usually placed at the west end.

979. When Smith and Harris settled in England, towards the latter part of the seventeenth century, for the purpose of taking part in supplying our Churches with new Organs, in place of those that had been so needlessly destroyed; they followed the custom, usual in their own countries, of placing their Organs at the west end of Churches not of cruciform shape; but they at the same time erected them in that situation, whether there was a window there or not. No instances are known of a *divided* Organ having been made by either of those artists, for the purpose of preserving an architectural beauty. The earliest English specimen of an Organ constructed in this manner, appears to have been that made by Green, for New College, Oxford. Many others have since been constructed in this way; one of

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* The Organ is really of CC compass, but having short octaves; which fact appears to have escaped the Doctor. See Foreign Specifications, No. 107.

the most successful in its treatment being that by Hill, in the Church of the Immaculate Conception, Farm Street Mews.

Their Cathedral Organs usually placed on the Choir screen.

980. The Cathedral Organs built by Harris and Smith were usually placed on the Choir screen. This situation appears to have been selected for two reasons. The instruments they were called upon to build for those spacious and venerable piles were scarcely a whit larger than those they made for ordinary parish churches; and it must therefore have been obvious, that if they were placed at the west end, the *firmness* of their tone would have been utterly spent before it could have reached the Choir. They were accordingly erected some 150 or 200 feet nearer to the vocal Choir, and generally in such a situation as a knowledge of acoustics prescribed as the best.

Harris's proposal for a grand west-end Organ in St. Paul's Cathedral.

981. Renatus Harris, indeed, made a proposal, in 1712, and therefore after the death of Smith, to erect an Organ in St. Paul's Cathedral, "over the west door, at the entrance into the body of the Church," which was to be such an one as "in art and magnificence should transcend any work of that kind ever before invented;" and in its construction it was intended to "apply the power of sounds in a manner more amazingly forcible than had perhaps before been known." (See Hawkins's History of Music, vol. iv, page 356; quoting the Spectator, No. 553, for December 3, 1712.) Is it possible, as this quotation would imply, that Harris had some partial acquaintance with the principle that Cavaille has in our own times carried out with such fine effect in his Harmonic Flute-work, and Hill in his "Tuba" Reed-work? At any rate, to *equal* "any work before invented," Harris's must, in size, have been a 32-feet Organ. But whatever the details of his plan might have been, the plan itself was not accepted.

The erection of Father Smith's Organ on the Choir screen of St. Paul's, opposed.

982. Father Smith had previously erected an Organ on the Choir screen of St. Paul's; but whether it should occupy that position or not, had been a subject of warm contention between Sir Christopher Wren and the Dean and Chapter of the Cathedral.

983. "Sir Christopher Wren," says the article in the *Musical Gazette*, from which we have before quoted, "wished the Organ to be placed on one side of the Choir, as it was in the old Cathedral, that the whole extent and beauty of the building might be seen at one view: the Dean, on the contrary, wished to have it at the west end of the Choir; and Sir Christopher, after using every effort and argument to gain his point, was at last obliged to yield. Schmidt, according to his instructions, began the Organ; and, when the pipes were finished, found that the case was not spacious enough to contain them all: and Sir Christopher, tender of his architectural proportions, would not consent to let the case be enlarged to receive them, declaring the beauty of the building to be already spoiled by the—box of whistles. After all this contention, the architect, sorely against his will, was obliged to make an addition to the case. He not only had been niggardly in regard to the depth of it, where another foot would have been of no consequence whatever, but also in the height;

for when Schmidt came to put in the large Open Diapason pipes in the two side flats, they appeared through the top nearly a foot in length, and spoiled the appearance entirely. Schmidt now entertained hopes of having a new case; but Sir Christopher, who before would not suffer any ornaments on the top, was now obliged to add several feet, or else alter the case, which vexed him exceedingly. These ornaments consist of angels, with trumpets, standing at the side of a small altar. The colour of the wood that these are made of being lighter than the Organ case, the addition is soon discoverable."

984. In this struggle, Smith evidently viewed the question *musically*, while Sir Christopher Wren considered it *architecturally;* and both had reason on their side. Sir Christopher was of course correct in asserting that an Organ in the centre would prevent the whole extent of the building being seen at one view; but then the objection applied with equal force against the Choir screen, to defend which, and condemn the Organ, involved a manifest inconsistency.

985. The result of the contention was, as we have seen, that

"Music won the cause;"

and the arrangements just detailed were uniformly followed in Cathedral and other Churches, from the time of Smith and Harris, down to within the last few years.

The comparative merits of the several side situations considered.

986. In recent times, the west end of a Parish Church, as the position for the Organ, has been strongly objected to, particularly where there is a Choir; and there is no doubt that a much better musical effect results from the Choir and Organ being near to each other—as a more united effect is produced in a Concert-room by the band and singers being together.

987. Next to the west end, the best place for the Organ, as indicated by the laws regarding the propagation of sound, will be some elevated position, having space above, and both sides free. These conditions point to the *side* of the Church; and in every instance, where all or most of them have been complied with, a very good effect has resulted.

988. The Organ in the new Church of St. Mary Magdalene, St. Pancras, built by Gray and Davison, may be cited as a successful example of an instrument so placed. It is supported on stone brackets, about 8 feet above the ground; has good head room; is entirely free at one side, and has a reflector immediately behind, in the south wall of the aisle.

989. In some instances, where sufficient room could not conveniently be found in the Church itself for the Organ, a recess or Organ-chamber has been built out from one of the sides for its reception. One old example of such an Organ-chamber exists in the Chapel of Christ's College, Cambridge. The tone of an Organ so placed is much weakened in consequence, as it cannot begin to spread and disperse till it has passed through and over the front of the case. The natural disadvantages of such a situation, however, can be considerably modified by making the chamber of ample dimensions, by lining it with wooden boards, and by furnishing it with a hollow wooden flooring. It is also of the highest consequence that there should be plenty of space between the top of the case and the turn of the arch; otherwise there will be no possible means of egress for the tone, which will then be smothered. All

these precautions were taken in constructing the Organ-chamber at the Temple Church, the flooring of which is 8 feet above the level of that of the Church; the Great Organ sound-board being 8 feet 9 inches above the chamber-flooring, and therefore 16 feet 9 inches above the ground; and there is also a clear height of nearly 13 feet between the spring of the gables of the case and the roof of the chamber.

990. An Organ that stands in a recess certainly appears to possess less strength of tone than if it were placed at the west end; but if there be plenty of head room over the Pipes, and attention paid to other circumstances favorable to resonance, what the instrument loses in power it frequently gains in sweetness of quality and Cathedral-like character of tone (as is particularly the case with that at the Temple); and as the loss of power can be easily compensated for by disposing additional Stops, there appears to be no reason why an Organ should not tell fully as well, if not better, at the side than from the west end, if every means be taken to make it do so.

991. By this it is not meant that an Organ placed in a side recess will tell as well, as the same kind of Organ would at the west end with space around it; but that if it be judiciously *enlarged*, in proportion to its *loss of power*, so as to counteract the otherwise ill effect exercised by the recess, it will then sound at least as well as the unenlarged west-end Organ. The distinction here intended to be drawn is well illustrated by the difference produced by a choral staff of a given number singing *forte*, as compared with a more numerous body singing *sotto voce*. Supposing the strength or abstract power of sound produced by each to be about the same, yet there will be a marked difference in the *quality* of the tone, which, under many circumstances, will be in favor of the larger, but softer, sounding body. The subduing influence of a recess, in a similar way, frequently imparts to the tone of an Organ a certain chasteness and kindliness of character, as well as a slight haziness—as though a fine veil were drawn over it—that is exceedingly pleasing, and even beneficial, if the volume and fulness of tone at the same time remain unreduced. The experiment of moving the Organ from the west end, and placing it in an ample and lofty Chancel Chapel, at the same time enlarging it, was being made at Doncaster Church at the time of the fire; and the effect of the few Stops that had been finished, are said to have promised the happiest result.

992. At Lübeck, the "little" Organ in St. Mary's Church—which, by the way, has upwards of 30 Stops, including 10 on the Pedal—partly projects from the east wall of the South Transept, and partly stands in a recess in that wall. The Choir Organ, containing 10 ranks of Mixture, stands in front; and the effect of the Instrument is altogether most admirable. The treatment of the position, so as to give to a moderately deep Organ only a shallow projection into the Church, is both ingenious and successful. Neither the view of the building on the one hand, nor the tone of the instrument on the other, is destroyed. This Organ is said to be about two hundred years old.

993. A most unfavorable plan, for the tone of an Organ, is that of putting the instrument in a recess, and placing the front Pipes so as to form an ornamental filling up of the arch. With walls on three sides, and a tier of large Pipes entirely occupying the fourth, the tone can only force its way through the interstices between the Pipes, as water escapes through the fissures in a flood-gate. The contrivance is, in fact, more calculated to keep the tone back, than to let it out. The Organ at All

Saints' Church, Manchester, built by Kirtland and Jardine, of that town, is most picturesquely treated, it being divided, and a portion placed in a recess on each side the Chancel; but the Pedal Open Diapason, which produces a very bold effect in the recess where it stands, sounds in the Church as weak as an ordinary Pedal Stopped Diapason. At the Church of St. Mark, Old Street Road, the Organ is similarly placed in a chamber; and the calculation of the Organ-builder, Bevington, is, that only *one-fourth* of the tone of the instrument finds its way into the Church. The melody of a Chorale played out on the Great Diapasons, Principal, and Trumpet of this Organ, sounds no stronger than it would do on the Stopped Diapason and Clarionet of most instruments that are favorably situated.

994. But the worst possible arrangement is that of putting the *Organist,* as well as the Organ, into a chamber at the side; filling up the arch, as before, with Pipes, which form an ornamental wall between the player and the congregation. This remarkable arrangement exists at St. Mark's, Old Street Road, where three-fourths of the Organ-tone is boxed in, and which, returning and descending on the Organist, often produces a din around him like that heard from a peal of bells in a belfry. The wall of Pipes is not only a serious impediment in the way of the Organ-tone travelling into the Church and reaching the congregation; but, telling both ways, it is as effectual a check to the voices of the congregation entering the recess and reaching the Organist. Added to this double impediment, the deep humming sound which the ornamental Pipes, forming the Bass portion of one of the Stops in most constant use —the Open Diapason—must be producing between the congregation and Organist, presents another difficulty in the way of the one hearing the other. Indeed this last arrangement has not one redeeming point to recommend it.

The east end of an aisle, or a Chancel Chapel, as the situation for the Organ, considered.

995. It has been a frequent custom during the last few years to place the Organ either at the east end of one of the aisles, or in an Organ Chapel on one side of the Chancel. These arrangements are far preferable to the one last noticed. In such a situation it is necessary (1) that the ground should be of wood, and hollow; (2) that the sound-boards should be kept as high as possible; (3) that there should be a good amount of clear space over the Organ; and (4) that as much ground space as possible should be allowed for the Organ.

996. The wooden floor increases the resonance; concerning which all has been already said that is necessary. The elevation of the sound-boards to a satisfactory height causes the mouths of the pipes to range above the heads of the congregation, whereby their tone is more likely to travel before it becomes absorbed, instead of being absorbed before it travels. It may easily be surmised how comparatively dull and muffled a clergyman's voice would sound, were he to stand only on the same level as the congregation; and the tone of an Organ that has its sound-boards kept low, will have a decided tendency towards the same fault. If the mouths of the Pipes, generally, can be kept as much above the level of the vocal Choir, as those of the Choir are above the level of the congregation, it will be so much the better both for singers and Organ.

997. The space over the Organ relieves the tone of the instrument from the force and hardness which its contracted situation, as compared with the west end, is

otherwise very liable to impart to it; while the greater space allowed for the Organ admits of the Pipes being planted in a less crowded and confused manner. Of the quantity of wind that enters at the foot of the pipes, something like three-fourths of it passes out again at the mouth; a comparatively small portion only entering the body of the Pipe. From this it must be obvious how necessary it is to allow the Pipes the utmost available room to "talk" in. When this is not the case, some Pipes have to be mounted on longer feet; others turned this or that way; and others grooved off here or there; not from design, or preference, but from necessity; and which packing and contriving give to the interior of an Organ a very unsystematic and disorderly appearance.

998. If the Organ be placed in a Chancel Chapel, there should be an arch—the more lofty, the better—opening into the Aisle, as well as one towards the Chancel. The importance of this arrangement is explained by the first fact mentioned at the commencement of this chapter, regarding the propagation of sound; and its object is to allow the tone of the Organ to pass down the Aisle, as well as across the Chancel. When there is no second arch, the whole strength of the Organ-tone is directed towards the vocal Choir in the Chancel, which is then more liable to be overpowered by it, at the same time that the congregation will scarcely experience any support from it. If there be two arches, and they are simply separated by a column, or a pier, this will be more favorable to the egress of the tone than an angle, formed by the junction of two walls, and having a hollow angle inside; which latter is apt to catch and throw some of the tone back, while the former would allow it to pass round and proceed onwards, diagonally, into and across the Nave of the Church.

999. As much free space as possible should also be left near to the Organ. This enables the tone to get fairly from the instrument before it begins to be absorbed by the dresses of the congregation. The Organ in the "Catholic and Apostolic Church," Gordon Square, built by Gray and Davison, which stands at the end of the south transept, on the ground, has plenty of free space around and over it, and sounds very freely in consequence. Space being left, and the congregation not being seated so near to an Organ, together, allow of the instrument being voiced more boldly and Church-like, with little ill effect and much good resulting. The conditions necessary to cause the tone to travel to the extremities of the Church can then be better attended to, without causing inconvenience to any one; but if seats be placed too near to the Organ, those who occupy them will hear more of its tone than they wish, while their clothing will prevent its getting away, and reaching those at a distance so effectually, by absorbing some of it before it can do so.

1000. If the several precautions just enumerated be taken, to prevent deadening the sound of the Organ, and to lessen the partial and unequal distribution of its tone, to which all side situations have an unavoidable tendency, an Organ may be made to tell very well in either of the positions just considered.

The Chancel an eligible position for a divided Organ.

1001. Another, and more rare arrangement is that of dividing the Organ, and placing a portion of it on each side the Chancel, where there is room; as at St. Margaret's, Leicester. (See Mr. Sparks' pamphlet on "Choirs and Organs," page 19, where this arrangement is illustrated with a wood-cut.) This plan is in every respect a most excellent

one. It is scarcely, if at all, inferior, even in a musical point of view, to that of a divided west-end Organ; while, under its working, the Organ is accommodated, without being sacrificed, to other arrangements that are now considered essential in most Churches. In the first place, as the Chancel is generally more lofty than the side Chapels, this circumstance admits of the sound-boards being kept up higher, the important advantage of which arrangement is already known to the reader. Next, as the Chancel is usually not very much less in height than the Nave, it affords nearly as much space over the instrument for the mellowing and sweetening of the tone. Thirdly, the Chancel being only occupied by the Clergy and Choir, it is comparatively unencumbered by absorbents and impediments; which is highly beneficial to the tone. Again, the Organ will still be at the "end" of the Church—although the opposite one to that which it frequently occupies—with the whole length of the edifice before it, into which its harmonious tones can travel. Moreover, by being placed to the east, with the vocal Choir nearer to the Nave, it will occupy its proper subordinate position in regard to the voices. No one would ever think of placing the instrumental staff between the vocal Choir and the audience in a Concert-room; and an analogous arrangement is equally ineligible in a Church. (In a theatre, the arrangement is different; but the *sunken* position of the band there tends to its subordination.) Such a distribution of the Organ might lead to a new use of the instrument, of an antiphonal character; of the advantage of which, however, we have at present had no practical experience in this country, although it would perhaps prove a source of many very fine and legitimate effects. The two parts could ordinarily respond to each other, after the manner of the separate sides of the Choir; and be united, by means of couplers, when the entire Choir joined in bursts of joyful exultation. Many Continental Churches are furnished with divided Organs in the Choir, or with two separate and distinct Organs; the effect of which, when used as above, is said to be singularly fine. Then, with regard to the construction of such an Organ, as the two parts would stand *sideways*, and therefore would be seen only in *profile* from the Church, their projection could be lessened, if room for greater breadth be allowed, whereby the view from west to east would be less interfered with. For the interior arrangements, the Abbé Vogler's system of Pipe arrangement might be advantageously employed, as being admirably calculated to facilitate the progress of the tone through the side of the case towards the Church.

The relative position of the vocal Choir and Organ.

1002. Respecting the relative position of the Choir and Organ in a Church, concerning which a few words may here be said; it may be accepted as a good general rule, that if the Organ is to be in a line with the Choir, it should not be on a level with it; and if it is to be on a level with the Choir, it should not be in a line with it. That is to say, the Choir should never be subjected to the direct force of the tone of the instrument. When it is so—as, for instance, when the Organ is placed immediately behind one-half of the Choir—that half hears the tone too strongly and palpably, while the clothing of its members deadens it, before it reaches the other part of the Choir. No given amount of Organ-tone, whether much or little, is then so equally and agreeably distributed to both. When the Organ is out of a line, but on a level, with the Choir, the Choir hears its tone, as it is spreading, with less force, but with equal distinct-

ness: when it is in a line with the Choir, but elevated above it, the Choir catches its sound as it descends in the course of its propagation. But, inasmuch as the sound produced at an elevation is necessarily less under the absorbing influence of the clothing of the congregation below, the plan of putting the Organ "in a line with the Choir, but above its level," is the preferable one. The tone of the Organ can then reach the congregation and support its voice, as well as that of the Choir. Hence the excellence of the arrangement at the Temple Church. At the Church of St. Mary Magdalene, St. Pancras, the Organ is above the level of the Choir, and also out of a line with it; and likewise produces an excellent effect.

Recent arrangements in Cathedrals.

1003. Much pains have been taken within the last few years to find a better place, architecturally speaking, for our Cathedral and Minster Organs.

1004. At the time the alterations in the interior of Westminster Abbey were in contemplation, a very excellent article appeared in the *Parish Choir*, No. 20, for August, 1847, from the pen of the Rev. Sir William Cope; in which it was proposed to erect the Organ at the west end of that Church, and at the same time to strengthen its tone as much as possible. The Choir screen was proposed to be placed at the west end, so as to extend across between the first pair of pillars of the Nave, with its architectural face to the east. The entire expanse of the Minster, from west to east, from the ground to the roof, would then have been seen at one view. "Let our readers," says the article alluded to, "now consider how splendid the whole expanse of the Church thus laid open would be; looking to the east end, the eye would rise from the Altar to the screen, and be led up by the beautiful apse to the vaulting of the roof; and if the spectator turned toward the west, he would see the stone screen surmounted by the Organ; above that would appear the whole extent of the perpendicular window, with its coloured glass, running up into the vaulting of the roof. And if, besides these architectural beauties, the eye of the Christian spectator were to rest on the vast multitude who (we are sure) would throng the expanse, and to see a reverent and attentive congregation joining, as they would then be able to do, with one mind and one heart, and, we trust, with one voice with the Clergy and Choir of that glorious Church, in those majestic hymns which form the Choral service of the English Church, would it not be a sight to which English Churchmen might point with an honest exultation?" This proposition possessed the unusual recommendation of treating the question musically, as well as architecturally; and, besides this, of providing for the orderly arrangement of a vast congregation. As the arrangements were subsequently carried out, the Choir screen was retained in its former position; the Organ was divided into four portions; the Great Organ being placed within an arch on the north side of the Church; the Swell under the corresponding arch on the south side; the 32-feet Pedal Pipes were laid horizontally along the west side of the screen; while the Choir Organ hung over the east side, in the usual way. The tone of the Organ, on the whole, tells exceedingly well, although the instrument is so much broken up; which, no doubt, arises partly from the two main portions not being put too much under the side arches, but partly projecting out from under them. The Organist, when seated at the keys, which are behind the Choir Organ, can hear the voices dis-

tinctly, and, what is of great consequence, can also hear and correctly judge of the effect of his instrument.

1005. At Ely Cathedral, the Organ, as reconstructed by Mr. Hill, under the direction of the able architect, Mr. Scott, is a *hanging* one; the appearance of which is most gorgeous. It projects from the *side* of the Choir, overhanging the stalls. The keys are placed behind—that is to say, on the aisle side; so that some portion of the Organ is directly between the Organist and the singers. The Organ, thus arranged, is very pleasant to sing to, and the Organist can hear the Choir Organ quite distinctly. The vocal Choir, also, he can hear pretty well; but the tone of the Great Organ does not reach him so readily.

1006. At Canterbury Cathedral, the Organ is placed in the triforium over the south side of the Choir, at a great altitude; and the keys are placed behind the stalls. The touch being both heavy and deep, it is a most laborious Organ to play upon; and on account of the length of the action between the keys and the pallets, and the manner in which the tone has to find its way down into the Choir, a perceptible interval occurs between the keys being struck and the sound being heard.

1007. In making praiseworthy endeavours to find a less prominent locality for our Cathedral Organs, every facility should be provided for the Organist hearing and seeing the Choir, and *vice versâ*. For this purpose, it would be an admirable plan to make the Organ play *at the side*. This arrangement has so many recommendations, and not one drawback, that it is surprising it should not, long since, have been generally adopted. The Organist, by a mere turn of the head, would then have at least half the Choir under his view; and could by a gesture, imperceptible to the congregation, convey a suggestion down to its members, or by the same quiet means receive one up from them. Moreover, the Organist would in all cases hear the voices much better. In the instance of an Organ on the Choir screen, if the keys were placed in the manner here suggested, the Organist could probably see *both* sides of the Choir, instead of *neither*, as at present; and at the same time he could also see to both ends of the Cathedral. If the keys at St. Paul's Cathedral were placed at the side—say to the south, the Organist could, on looking to the right, see the vocal Choir, if congregated in the Choir of the Church; and on looking to the left, perceive them, if assembled under the dome. Another important end would be gained by placing the keys of a Cathedral Organ in the manner under consideration. The space of the Organ-loft could be taken into the Great Organ case, by moving the east front forward to the back of the Choir Organ, and inserting new panels to fill up the openings in the sides; which would admit of a material improvement in the Organ, by admitting of the introduction of many large Pipes, on the tone of which the true dignity of the Organ so much depends. The arrangement above recommended may be met with in Snetzler's Organ, at Beverley Minster; which instrument, standing on the Choir screen, has the keys on the north side.

CHAPTER XXXIII.

THE SIZE OF THE ORGAN.

The Organ should be proportioned to the congregation and Church.

1008. THE size or contents of the Organ should, as a rule, be regulated by the number of the congregation whose united voices the instrument will have to sustain; and by the dimensions of the Church in which it is to be placed. This is assuming that the usefulness of instrumental support, as an aid to the voice, in devotional exercise, is admitted; which point, however, is not conceded by some religious denominations. The question before us, however, is not whether an Organ is admissible for the purpose above specified, but—that opinion being supposed to be acquiesced in—what should be the properties and attributes of the instrument, to render it adequate to its purpose. The size of the Organ would also be influenced by the kind of Stops chosen—whether they are chiefly of loud or soft intonation;—Dulcianas, Flutes, and Piccolos usually having little to do with the power of an Organ, although they increase the number of its Stops, and materially add to the number and variety of its soft and agreeable combinations.

Certain influencing circumstances to be taken into account.

1009. The acoustical capacity of the Church, again, must be taken into account; some Churches being as good for sound, as others are bad; as is well known to most clergymen, who find little difficulty in filling some, while they have great trouble in making themselves heard in others. If there be much echo—a circumstance that may soon be ascertained by sounding the voice in various parts of the Church—such a natural advantage will be much in favor of the Organ; but if the sound do not get away, but immediately fall dead, then more Stops should be disposed, to enable the Organ-tone to make its way; or a greater proportion of loud Stops might be introduced; or the whole should be more strongly voiced and blown. Some such steps would also have to be taken, if the Organ is to be placed where its tone is likely to be weakened; as, for instance, in a recess.

An approximate calculation of the number of Stops necessary for an Organ to have.

1010. From what has just been said, it is obvious that the number of Stops necessary for an Organ to have, cannot be deduced with absolute certainty from the number of the congregation; although an approximation to it may be drawn from

that source. According to Seidel (page 161, in Ewers' English edition; 208, in the Breslau copy), for a congregation of from 200 to 300 persons, an Organ with from 8 to 10 Stops may suffice; for one of from 400 to 500, an Organ of from 12 to 16 Stops; and for a congregation of from 1000 to 2000, an Organ of from 24 to 30 Stops. In this calculation, allowance is not made for Half-stops; still less are the Couplers and other mechanical contrivances taken into account. Half-stops are of comparatively rare occurrence in German Organs; although Short-stops are common enough, particularly among the Flute-work. When a Stop only extends to Tenor c, it is usually grooved into the Bass octave of some other Stop below, instead of that other Stop being cut to draw in halves, as is the more frequent custom in England. Neither are Couplers included in the calculation, since they have no "voice"* at all. With these exceptions, and making some allowance for the addition to the number of a few soft Stops that are in great favor in this country, the above calculation is a very good one.

Too small an Organ in a Church, most undesirable.

1011. As it is quite as great an evil to design too small an Organ for a large Church, as it is to plan too large an one for a small Church, it may be well to explain why an instrument of fair proportions may with confidence be admitted into a place of worship. The primary purpose for which an Organ is introduced into a Church, is to support and direct the voices of the congregation. It therefore becomes necessary to ascertain, if possible, what may be the strength of that congregational voice which the Organ is expected to sustain.

The strength of the human voice, as compared with that of the Organ-wind.

1012. To this a clue may be obtained by a very simple experiment. If an anemometer be provided with a flexible tube, furnished at the end with a large mouthpiece, and the breath be freely expired into it; the index, prepared at the side, will show that the human lungs produce, without any very great exertion, a current of air of 9 or 10 inches pressure; the Manual departments of a Church Organ being ordinarily voiced to a wind of from $2\frac{1}{2}$ to 3 inches pressure. This result, perhaps scarcely expected by many, makes it apparent that the human voice, when firmly delivered, is sounded by a wind 3 or 4 times the strength of that which ordinarily gives speech to a Church Organ. Then the sound-waves which surround every singer—as they encircle an Organ-pipe that is speaking—are proportioned in strength to the power of the voice that originates them; and at the same time they to some extent prevent his hearing other external sounds distinctly.

The general requisites of a Church Organ.

1013. Now a Church Organ should possess sufficient fulness, penetration, and depth of tone, to make its way through all other sounds, to the ear of the congregation; and

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* In German Specifications, the Stops are generally called *Klangbare Stimmen* (sounding voices), and the Couplers and other mechanical contrivances *Nebenregister* (accessory or secondary registers).

support, keep in tune, and lead the united voices of its members. Whether much or little Organ will suffice for this, is a question that must depend not only on the number of the congregation, and the dimensions of the Church, to which its size and power should in the first place be adapted, but also on whether the entire congregation takes part in the singing, or only a portion; and whether the many or few who tune their voices, do so boldly or timidly. In those large Churches abroad, wherein great numbers assemble, and among whom the singing is both general and zealous; where, in fact, may be heard the finest congregational music—namely, in some of the Protestant Churches of Germany and Holland—there will also be heard the largest Organs in the world. The "music mill" has long been considered the necessary concomitant of the "vocal thunder;" and the two have been exercised conjointly, from week to week, for centuries;—the one in uttering, in unison, the melody; the other, in playing in fine progressive harmony, the simple and magnificent Chorales of the former country;—without the one injuring the effect of, or obscuring, the other in the slightest degree*. And it is now tolerably clear why no ill effect should have resulted from this union of instrumental with vocal sound. It would not be easy for an Organ, voiced to a $2\frac{1}{2}$ or 3 inch wind, to interfere with an assemblage of 800 or 1000 voices, singing with a strength equal to a 9 or 10 inch pressure of Organ-wind, if its tone be mellow and its Stops well balanced.

An Organ of sufficient dimensions in a Church, a great acquisition.

1014. A fine Organ, then, may fairly be considered as a great acquisition for a Church to possess; provided, of course, that its powers only be fully exercised on rare and befitting opportunities. Mr. Spark, in his pamphlet on Choirs and Organs, page 11, gives a good instance when the full peal of an Organ may be beneficially employed. "Who," he writes, "can have heard a crowded congregation in a large Church sing with heart and voice that glorious, time-honored tune, the Old 100th Psalm, accompanied with the full power of a great and beautiful Organ, and not acknowledge the powerful aid and thrilling effect which a grand Organ gives to some portions, at least, of our Church Service?" At such times, the propriety of a cheerful accompaniment is at once recognized by the members of the congregation: they raise their voices, energetically and earnestly, under the combined influence of the service, the occasion, and the appropriate tone-character of the Organ:—the Trebles, singing in unison with the melody, and the Tenors and Basses below, add immense strength, in the *Unison and Double Diapason pitch*, to the mass of musical sound,—the result being that the Choral song stands out distinctly in bold and grand relief, through the dignified and impressive peal of the full Organ.

1015. Thus much has been said to illustrate what an Organ should be *capable* of, when the upraised voice of the congregation may put its powers to the test. Of course, there are times and seasons when the hymn of praise and

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* It should be mentioned, that while unison singing is at once the most simple in kind; the most easy of execution; and the most appropriate for a congregation to adopt; it is at the same time the most powerful in effect, from its concentrating all the vocal force into one part; and is therefore the kind of congregational singing that requires the most Organ for its support.

thanksgiving would be hushed, and the song of sadness raised in its stead; and on which occasions the Organ-tone would have to be reduced to accommodate it to the altered sentiment of the words. The strength of the congregational voice itself would also, at such times, be much lowered. With regard to the Organ, however, this forms an entirely separate question; and presents no subject for consideration, while the power requisite for the instrument to possess is being discussed, but rather bears on an important matter connected with its after-use. On this latter head, much has been said in a former Chapter: it need, therefore, only be added in this place, that when a subdued tone is desired—produced of course by using a portion only of the Organ—those Stops should be selected that will give the requisite "tone-colouring" to the words, *in addition to* affording the exact amount of support required. On this point, a very correct idea will be obtained of the manner in which an Organ should be used, by a reference to the vocal and instrumental scores of Mozart, Spohr, Mendelssohn, &c.; from which it will be seen, that, however extensive the orchestra at disposal, their authors have not yielded to the temptation of using a single additional instrument beyond what were necessary for the particular purpose; but have first confined themselves within the proposed limits, then proceeded to select such instruments for use as would sympathise the most closely with the words to be sung, and yet at the same time produce so *transparent* an effect, that the voice could be heard clearly and definedly through the whole. These are precisely the several processes that should be gone through, to secure the best, because the most appropriate, kind of subdued Organ-tone for accompaniment; that is, if the Organ admit of a choice.

The power of an Organ partly due to its extent of tone.

1016. It was stated just now, that, while an Organ is commonly voiced to a $2\frac{1}{2}$ or 3 inch wind, the human voice is frequently produced by a current of air equal to a 9 or 10 inch wind. This fact would seem to imply that the tone of an Organ must be much weaker than that of voices; and although the above figures may or may not represent the *exact* comparative strength of the two, yet there is no doubt of the fact, that *unison* Stops alone in an Organ would be quite unequal to the support of a large body of strong voices. Organs, therefore, are never made with this one class of Stops alone; because they then could not possess the requisite force and power. The "power" of an Organ is in a great measure due to its greater *extent* of tone, as compared with that of voices; *pitch* exercising a most remarkable influence on its loudness. Every one is aware that, in a quartet sung by the four varieties of male voice, the Treble part always sounds the most prominent, *not* because the boy's voice is the most powerful, for it may be the weakest, but because it is the *highest*. So great is the influence which acuteness of pitch exercises, that the general ear, and consequently voice, will follow the upper part of a four-part harmony, whether it should do so or not. Of this, a remarkable instance is given, on all occasions when Tallis's Responses are sung in Cathedrals, i. e. on Church Festival days. The chief Melody or "Plain Song" is set in the Tenor, for which reason it remains unrecognised by the congregation generally, who never follow it, but on the contrary, take the Treble or acute part, which in reality is only a portion of the Choral accompaniment.

1017. Now, for the same reason that the adult male members of a congregation hear the Trebles so much more clearly than the Choir voices that are in unison with their own, the Trebles hear those of an Organ-stop that sounds the octave above their voices much more distinctly than those that are in unison therewith. This fact must be familiar to all who have had much experience in accompanying a Choir, and who will have noticed this illustration of it, that if the Treble voices get flat, they will be set right much sooner by drawing the Principal, or by playing the melody in octaves, which will produce the same kind of effect, than by adding a number of other Unison Stops. The addition of one Principal to the Great Diapasons will, at such times, be heard more distinctly by the Trebles, and will exercise a far greater corrective influence, than the addition of three or four Unison Stops from the Swell, by means of coupling, even if there be one or two Reeds included among the number. This, however, does not arise from any greater power possessed by the Principal; for in that respect it is inferior to the other accessory mentioned; but from its acuteness. The influence of high-toned Stops extends still further; for the same reason that the Principal adds clearness to the Diapasons. The Fifteenth and Twelfth impart a penetrative quality to the tone; while the Mixtures add sharpness and perhaps keenness, according to their composition and other circumstances. So much for the Stops sounding *above* the unison. But the remaining Stops also fulfil certain important conditions. The Unison and Double Stops impart a fulness to the tone that is appreciably felt by a Choir and congregation, and conduces, in conjunction with the Pedal Bass, to convey that sensation of *nearness* of accompaniment to the singer that is of such essential consequence in infusing confidence and affording encouragement to those who need support. The Pedal Bass, in its turn, marks the progress of the music; and that much more effectually than any of the other Stops could do. Summing up, then, in a few words, the influence which the three classes of Stops exercise: the Octave and other acute Stops tend to keep the voices in tune; the Unison and Double Manual Stops afford them support; while the Pedal Diapasons, by marking the time in the course of the onward movement of the music, keep them together.

How the acoustic capacity of a Manual Organ is increased, to adapt its tone to a large building.

1018. What has hitherto been said, has had more especial reference to the requirements of an Organ as an accompanimental instrument. But it is necessary also to consider by what process of development an Organ, as an independent instrument, is made to fill, with its musical tones, a building, however large its dimensions; particularly as this point has not the less bearing on the question concerning its efficiency and excellence in the capacity already considered. The presence of a Double Diapason has already been mentioned, as being necessary in an Organ to support the Tenor and Bass voices in a congregation, as the unisons do the Trebles. But a Stop, or Stops, of that size are required to fulfil another end, totally distinct, but of not inferior consequence. If a chord be played in the Treble part of the Great Organ, of an instrument placed in a large building, and not having any Stops lower in pitch than the unison, there will be perceived a certain *smallness* of effect, which makes it evident that, although the Treble may possess sufficient brightness and intensity, perhaps even amounting to shrillness, yet it

lacks the amount of fulness and volume necessary to produce an ample and dignified tone. This arises from the fact of even the Unison Pipes in the Treble being comparatively acute in their sound; and, therefore, in the very nature of things, unpossessed of stately impressiveness. It thus becomes obvious that the harmonic corroborating series of Stops alone do not present *all* the resources necessary to form a satisfactory Organ. Something that is essential appears to be wanting; and a fresh element is felt to be necessary to supply that absent property.

The acoustical grounds on which Double Stops are introduced into an Organ.

1019. The property wanting is *gravity;* which possesses a character peculiar to itself, and for the absence of which no amount of intensity in the other sounds will compensate. Of the travelling and filling-up character of grave sounds we have already spoken; and of the fact itself, a sufficient illustration is given in the circumstance of a Chant sung by twenty Tenor and Bass voices, in unison, pervading a building more completely than if sung by thrice the number of Trebles. Again, the deep tone of a Pedal Diapason will travel through a building more entirely than a doubled chord of six or seven notes played on the Manual Diapasons, from middle c^1 upwards. Its sound will certainly not be nearly so well defined; but it will be of a more pervading character. The want felt, and above specified, however, is not a *substitute* for the harmonic sounds, but a new element, which, *added* to them, shall render the general tone larger and more ample. It is worth mentioning, that this want was so much felt, nearly three centuries and a half ago, abroad, that means were, even at that period, taken to supply the deficiency. It was about the year 1508, that a Covered Stop of 16-feet size of tone was invented in Holland; and which, to some extent, imparted the necessary, deep, resonant, *humming* effect to the other Stops, and was hence expressly called Bourdon; a name that means a hum or drone; and which Stop has never ceased to be highly valued abroad to this day.

1020. The strength of this under-sound has to be regulated by the size of the Organ, and the dimensions of the building in which it is to stand. For an ordinary Church Organ, a Bourdon (Double Stopped Diapason) is generally sufficient; for a larger instrument, a Double Open Diapason is also required, perhaps accompanied by Double Mutation Stops; for a still larger one, a 16-feet Double Trumpet is necessary; and for Organs of first class magnitude, a small Sub-Bourdon, in addition, of 32-feet tone, as far as Fiddle g or Tenor c, sounding GG or CCC. When a Manual Organ is thus developed, its Treble becomes endued with such a dignified character and a filling-up quality, that in the largest buildings it may be used by itself with the most impressive effect.

The effect of a large Organ not constructed on acoustic principles as well as on harmonic.

1021. It has been thought necessary to enter thus fully into this subject, because there are many who hold that all Double Stops are inadmissible, from the circumstance of their not being included in the harmonic suggestions of nature. This opinion, however, does not imply a complete view of the question. The rearing of a large Organ is not governed simply by the laws of *harmonics;* but also by the laws of *acoustics*. These latter have already been sufficiently considered in

the previous chapter ; and it only remains here to point out what an Organ becomes, when the claims of the latter are overlooked. The greater the number of Stops introduced into the Great Organ, and the greater the quantity of Chorus-work, the more is the tone of the Treble *drawn upwards*. The greater the number of ponderous Stops put on the Pedal, the more the Bass is *drawn downwards*. As the size of the instrument is increased, so is this effect of the *severance* of the two parts in proportion ; which accounts for the fact of the largest Organs, built *not* on acoustic principles *as well* as on harmonic, being the greatest failures. The two parts contain no one property or characteristic that is common to both. Instead of the Manual tone being extended downwards to meet the Pedal, by means of Doubles, &c. and the Pedal being extended upwards to meet the Manuals, by means of Mixtures, &c. ; the 8-feet and smaller tones of the former, and the 32-feet tone of the latter, draw the two asunder. The sharpness of the one, and the turbulence of the other, instead of producing the effect of harmonious amalgamation, convey an impression of the two parts being engaged in an angry altercation. It then becomes necessary for the left-hand of the Organist to be employed in holding down nearly every concordant note within reach, to disguise the deficiency.

1022. It is inconsistent with the credit and real dignity of the instrument, that its good or bad effect should depend on the player's power of hiding a defect. All the properties and attributes for producing the best and a perfect effect, should be embodied in *the Organ itself ;* but this will not be the case, unless what is acoustically necessary is provided, as well as what is harmonically so.

CHAPTER XXXIV.

VARIOUS MATTERS CONNECTED WITH THE DIVISION OF THE STOPS, AND THEIR SELECTION ACCORDING TO THEIR SIZE.

The proportionate division of a given number of Stops among the several departments.

1023. In distributing a given number of Stops among the several departments of an Organ, care must be taken not to devote too great a proportion of that number to one department, and so few to another, that the latter will be insignificant beside its compeer; but the endeavour should be made to develop all the departments that are proposed to be introduced at all, gradually and simultaneously.

1024. The Great Organ, as being the most important department, and the one required to have the fullest tone, should have the greatest number of Stops. The second Manual (Swell) need not have quite so many, although the difference ought not by right to be great. The third Manual, if there be one (Choir), would perhaps have somewhat fewer again. The Pedal might have, as the maximum number, as many Stops as the Great Manual; the German proportion often exceeding this. The minimum proportion for the Pedal should be one third as many Stops as there are on the Great Manual. Below this ratio the German Organ-builders never descend, except for instruments of the most unpretending description.

1025. According to the size of the proposed Organ, the Stops would be assorted into from 2 to 4 or 5 separate divisions. In thus assorting them, two extremes have to be avoided; namely, of reducing a moderate number of Stops into too many divisions, and of confining a large number of Stops to too few Claviers. By the former course, in consequence of the Stops of every Clavier having to commence with the unison, several and minute varieties of the same Stops must necessarily be introduced, which might, under the circumstances, be very well dispensed with; while the effect of the whole is small as compared with what it might be. On the other hand if a great number of Stops be assorted into too few divisions, the Stops that produce the more delicate gradations or shades of tone, if introduced, cannot then be used with the same facility, advantage, or convenience. A greater number of Manuals will always possess advantages over a smaller, provided the Organ-tone be not dispossessed of its proper dignity to secure them.

1026. As a rule, possessing sufficient accuracy to answer all general purposes, it may be laid down, that an Organ with 8 Stops might have 1 Manual; one having from 12 to 30 Stops, 2 Manuals; and one with from 24 to 60 Stops, 3 or 4 Manuals. In each case there should be separate Stops for the Pedal, as far as possible.

1027. It may in some cases happen that there are large funds at disposal. If, under such circumstances, it be thought desirable to add to the comparative completeness and efficiency of the Organ, without increasing its strength of tone, or throwing it out of proportion with the Church, this could be done either by adding a second Manual Organ (Swell); or, if that be already designed, a third Manual Organ (Choir); or it might be effected by proposing extra Stops of a delicate character of tone.

The size of Stop that should form the basis of the Manual and Pedal tone.

1028. The next point to be observed is the size of the Stop that forms the unison or basis of the Manual and Pedal tone. For all the Manuals this would be the same—namely, 8 feet; but for the Pedal, 16 feet. The Stops first to be selected for the former must therefore be of 8 feet, or 8 feet size of tone; and for the latter, 16 feet, or 16 feet size of tone.

Stops of one size only, for Manual or Pedal, incorrect.

1029. At the same time it would be incorrect, for reasons already assigned, to place only 8-feet Stops on the Manual, and only 16-feet on the Pedal. The effect of such a selection of Stops, at first serious and solemn, would gradually become dull and monotonous, and then oppressive and dispiriting. Other and smaller Stops are required to give life and energy to the Organ-tone, and to serve the numerous other purposes mentioned in former chapters.

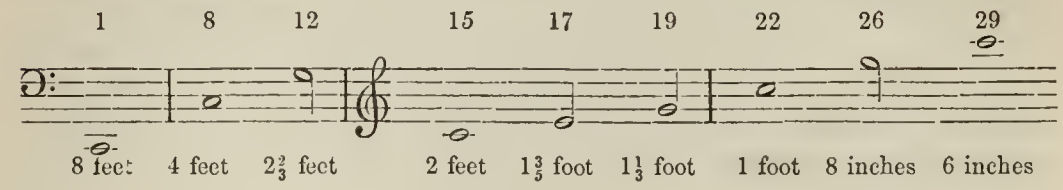
The proper size for the Stops; and the order in which they should be selected.

1030. A Table of the smaller Stops just referred to was given on page 128. All these of course cannot be placed in *every* Manual Organ in the first instance. They are not indeed required; for the individuality of character in the tone of the several Manual departments depends as much on the size and proportion, as on the choice and scale of the Stops with which they are each furnished.

1031. Where, however, fulness and power are required, as is always the case with regard to the Great Organ of even small instruments, the series of smaller or harmonic corroborating Stops should be introduced in a complete form as soon as possible, or the above-named essential requisites will not be secured to the full extent. When, however, the Church is very small, the funds limited, or there is any other circumstance to prevent the introduction of all the ranks of Pipes in question, then those Foundation ranks which are the nearest in pitch to the fundamental or ground-tone should be first selected. Thus the Principal, 4 feet, must be the first Stop of the series introduced, after the Unison Stop itself. Next to that, the Fifteenth. It is a rule never to propose a Third or a Fifth-sounding rank without the Octave-sounding rank the next smallest in size to itself being also introduced to cover its tone. This is why the Twelfth is never disposed before the Fifteenth; although its size is $2\frac{2}{3}$ feet, and that of the latter only 2 feet. In like manner the Seventeenth or Tierce, and the Nineteenth or Larigot, should always be accompanied by the Twenty-second or Octave Fifteenth, or the Mutation tone may appear remarkable, or even offensive.

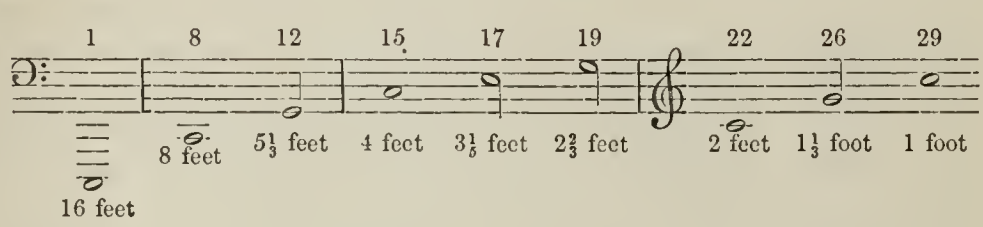
The Stop from which the harmonic corroborating Stops must be measured.

1032. As the tone, on the one hand, would tend towards thinness, if any of the requisite Mutation ranks were to be omitted; so, on the other, it would become thick and indistinct if Mutation ranks of too great size were to be introduced. It is very necessary, therefore, to bear in mind from which Stop the harmonic series should be measured, as this will prevent the occurrence of either error. The proper Stop to be used for this purpose is the largest one of the Open Diapason species proposed to be placed on the same Manual. If that Stop is to be of 8 feet, the harmonic series would, for the theoretical reason before explained, be as follows:

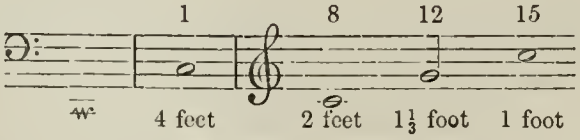


1033. The order of the harmonic sounds will easily be committed to memory, if the series be viewed in this way. All the octave sounds are required. The interval of the first octave from the Fundamental tone must not be broken; the second should be broken by a Fifth only; while the third may be broken by a Third* and Fifth. In the above example, the filling-up sounds, in their correct situations, are represented by minim notes.

1034. If a large Organ is proposed, having a 16-feet Stop—Double Open Diapason—the harmonic series will be of the following sizes and pitch.



1035. For a small Choir Organ, having no larger Stop of the Open Diapason species than the Octave or Principal of 4 feet, the following would be the proper sizes for the Harmonic series:



1036. As to the naming of the Stops of the Manuals, this point is always decided in England by their pitch in relation to the unison tone of those departments, as shown in the following scheme.

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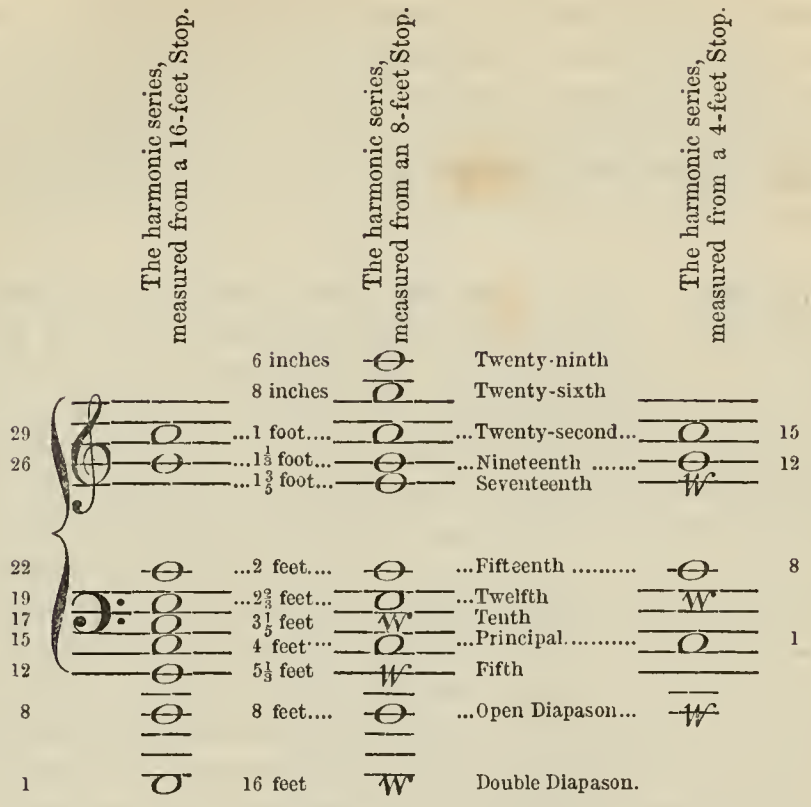
* In Germany, the Tierce is not commonly introduced into new Organs of moderate dimensions, on account of its not harmonising so well with the sharp thirds of the equal temperament. The flat Twenty-first is never included, even in the largest Organs of that country.



1037. We perceive, from the middle column of the above scheme, that when the largest open cylindrical Stop of full scale is only of 8 feet, it would be wrong to introduce either a Fifth or Tenth (see directs); because they form no portion of the 8-feet harmonic series, but of the 16. Or, to put the fact in a *practical* instead of a *theoretical* form, the Fifth would break the first octave from the fundamental tone, and the Tenth would introduce a second filling-up sound into the second octave. In *effect*, these would, under such circumstances, obscure the Foundation tone, and render the whole thick and indistinct.

1038. The Twelfth, on the contrary, would be a necessary Stop to dispose to an 8-feet ground-tone. This, however, in its turn becomes inadmissible, when the largest Stop of the Diapason species is only 4 feet in length; as shown in the third column of the above scheme.

The meaning of the German terms, 16-feet Manual, 8-feet Manual, and 4-feet Manual.

1039. As the meaning of the German terms "16-feet Manual," "8-feet Manual," and "4-feet Manual," are by no means generally understood, an explanation of them may not be uninteresting in this place. They have by some been supposed to signify a CCC Manual, a CC Manual, and a Tenor c Manual respectively: whereas, in reality, they refer to nothing of the kind. The German Manuals never descend below CC, and they very seldom fall short of that compass. The terms refer to the size of the greatest Stop of the Open Diapason kind on the Manual to which either of the three may be applied. If the Stop in question be of Sub-octave pitch, corresponding with the English Double Open Diapason of 16 feet, the Manual on which it stands is said to be a 16-feet Manual. If it be of 8-feet length, the Manual is said to be an 8-feet one. The fact of there being a Bordun of 16-feet tone, and

perhaps even a "Gedact-Quint," or a "Rohr-Quint" (Stopped Fifth, $5\frac{1}{3}$-feet tone), does not affect the classification. If the largest Stop of the Open Diapason species is of 4-feet length only, as is usually the case with English Choir Organs, that Manual is said to be only a 4-feet Manual. The presence of the Stopped Diapason, and perhaps other Unison Stops not of the governing kind, are again not permitted to affect the classification.

Stops of one class alone not sufficient to produce the best Organ effect.

1040. Two facts have already been mentioned, that the harmonic series of Stops are usually formed of Pipes of the Open Diapason species, and that the presence of that series is essential to the production of a full and satisfactory Organ-tone. At the same time those Stops do not present *all* that is necessary to produce the best attainable effect. No single class of Stops can do this. For instance—Open Stops of the Diapason kind, alone, would produce rather a cutting tone; an Organ entirely of Covered Stops would sound weak and muffled; while one composed entirely of Reeds would be too strong and penetrating. The four great classes of Organ Stops—Open, Covered, Flute, and Reed—are, in fact, to a great extent dependent on each other for the production of the most satisfactory result. The Covered Stops impart a quiet solidity to the Open Stops; the Open Stops bestow roundness and firmness on the Covered Stops; the Flute Stops give variety and increased character to the soft combinations; while the Reed Stops impart to the full Organ stateliness and splendour, and in return receive fulness and brightness from the Open series of Stops.

The proportion to be observed in the number of Stops of different sizes.

1041. In selecting Stops from the Covered, Flute, or Reed species, for addition to those of the Diapason kind, certain proportions should be observed in regard to the number of each size proposed to be introduced, or the proper balance of the general Organ tone will not be preserved. The foundation tone should in all cases predominate over the mutation sounds; and in like manner the unison sound should predominate over all the octave sounds. The former point is attained by *doubling* the number of 8, 4, and 2 feet ranks or Stops; and the latter by introducing more 8-feet stops than of 4-feet, and a greater number of 4-feet Stops than of 2-feet. For the regulation of these matters, certain general rules are laid down in Germany, which are embodied in what follows.

1042. A Great Organ Manual should ordinarily have, besides the Open Diapason, from one to three or four other 8-feet Stops, according to the size of the instrument. In addition to these, there should be a good proportionate number of 4-feet Stops. These latter should be, at the least, half as numerous as the 8-feet; and if of those of 8-feet there should be an odd number, the balance should be given in favor of the 4-feet Stops.

Thus, (1) to two 8-feet Stops, there should be
one 4-feet Stop;
(2) to three or four 8-feet Stops, there should be
two 4-feet Stops, and
one 2-feet Stop;

(3) to four or five 8-feet Stops, there should be
three 4-feet Stops, and
two 2-feet Stops.

1043. The Stops should, in fact, in regard to their proportion and size, be arranged after the manner of a pyramid; lessening gradually as they rise.

Thus, for a small Great Organ they should stand thus:

to three 8-feet Stops,
two 4-feet Stops,
one $2\frac{2}{3}$-feet Stop, and
one 2-feet Stop.

The Twelfth would be required, to give that kind of "Chorus" effect which is so desirable a characteristic for even the most limited Manuals of the kind to possess.

1044. A Great Manual that is to have 9 or 10 Stops should include a Twelfth, a Compound Stop, and a Bordun. This would make the second of the three tables just given take the following form:

One 16-feet sounding Stop;
three or four 8-feet Stops,
two 4-feet Stops,
one $2\frac{2}{3}$-feet Stop,
one 2-feet Stop,
one Mixture of 4 or 5 ranks—9 or 10 Stops.

1045. If the Great Manual is to have 16 Stops, it should include two 16-feet Stops and a Quint of $5\frac{1}{3}$-feet. These would give to the third table the following form:

Two 16-feet Stops,
five 8-feet Stops,
one $5\frac{1}{3}$-feet Stop,
three 4-feet Stops,
one $2\frac{2}{3}$-feet Stop,
two 2-feet Stops,
two Mixtures, comprising 7 ranks—16 Stops.

1046. It will be understood, from a glance at the foregoing tables, that it must be manifestly improper to propose two Twelfths with but one Fifteenth to cover them. If they were to speak out properly, the fifth sound would certainly be stronger than the octave, and the predominance of the foundation tone would be to some extent obscured. There would then appear a certain thickness and nasal quality in the tone. It would be equally wrong to propose a greater number of 4-feet Stops than of 8-feet; or a greater number of 2-feet than of 4-feet. Either of these latter miscalculations would have the effect of drawing the tone up from the unison pitch, whereby the requisite fulness and gravity would be lost, and an undue brightness and thinness substituted.

1047. The foregoing schemes and observations have more immediate reference to the properties requisite for the Great Organ to possess. They, however, apply equally to all the Manuals, and indeed to the Pedal also; but the Swell and Choir Organs are seldom furnished with as many Stops as the Great; and moreover are not developed in the same manner. For instance—the Harmonic series of Stops are

among the first to be proposed for the Great Organ; their importance is shared by the Reeds in the Swell; while, in the Choir Organ, they are the very last that find admission.

1048. The Swell may be considered as an Echo to the Great Organ in one sense, and as a Solo Organ in another; and the Stops that are selected for it in these two capacities, render it a most valuable division of an Organ for accompanimental purposes.

1049. To serve as an Echo to the Great Organ, the Swell should have, besides the two Diapasons, the Harmonic-corroborating series of ranks complete, as far as practicable; and also a Bordun. As a Solo Organ, it requires two Unison Reeds as a commencement. The proportion in the number of Unison and Octave Stops, even in a small Swell, will therefore almost of necessity stand in the following ratio; namely,

to four 8-feet Stops,
one 4-feet Stop;

but the proportion would be much better preserved, and the effect more than equivalently improved, by the insertion of a second 4-feet Stop—as, for instance, a Clarion. One of the reasons why Reeds are so soon and so freely introduced into a Swell, is that, on account of the Stops being enclosed in a box, the tone must be of a more penetrating quality to make itself heard; and a strong and a weak Unison Reed are therefore proposed, which stand in about the same relation to each other, in regard to strength of tone, that the Open and Stopped Diapasons do to one another. It is also for the above reason that the second 4-feet Stop, proposed for the Swell, is almost always a Clarion in preference to a Flute.

1050. The Choir Organ should be of a *lighter* tone than either the Swell or the Great Organ. By this it is not meant that it should be so very much *softer*. Choir Organs have sometimes been voiced with the delicacy of a Chamber Organ; and have therefore, for Church purposes, been of little use. Excellent examples of what the comparative strength of the like Stops in the Great and Choir Organs should be, will be found in some of the best old instruments which still remain: not indeed that the Choirs of those Organs present good models for literal reproduction; for they are, or were, in their original form, very much out of proportion. It was a constant practice with the old builders to propose a Stopped Diapason only, to stand against two 4-feet Stops and one 2-feet Stop. Instead of the unison tone being properly maintained by such a specification, it was completely overbalanced by the higher sounds, and a quality of tone was produced that was characterised by excessive thinness, in spite of its sprightliness. Probably this misproportion in the old Choir Organs arose from the same cause which operated against the proper balancing of the old Great Organs; namely, lack of room, want of funds, or both. In later examples of Choir Organs, a Dulciana was generally introduced; but so weak an unison, even as an addition, was insufficient to reduce the strong-toned Principal and Fifteenth into proportion; hence the custom was introduced of voicing the last-mentioned Stops much more quietly than before; and this two-fold modification, while it certainly had the effect of producing a more equally balanced Choir Organ, at the same time brought in the chamber quality, as already mentioned. The attributes for a Choir Organ are lightness and variety, rather than fulness and power; hence a given number of Stops,

that would in the case of the Great Organ require a Twelfth and a Compound Stop, neither call for the one nor the other when appropriated to the Choir Organ. A good number of 8 and 4 feet Stops, comprising delicate accompanimental and Solo Stops, are among the first that should be selected for this department.

1051. The Pedal Organ should contain a "Bass" to as many of the leading Manual Stops as circumstances will allow. A good complement of 16 and 8 feet Stops should first be disposed for this department; particularly as all smaller Stops can be conveniently borrowed by coupling the Manual to the Pedal. The 16-feet Stops are the most indispensable, because their tone forms the true basis of the Pedal tone. Of scarcely less importance are the 8-feet Stops. When there is a choice of Stops of this latter size, the Pedal can then, in soft playing, be freely used without there existing any necessity for coupling either of the Manuals thereto to produce a good effect. The left hand, moreover, will not then be constantly deceived by descending on a key that is already down.

1052. With regard to the proportion between the 16 and 8 feet Stops on the Pedal, this should be the same as in the Great Organ; and when there are 10 Pedal Stops, these should include either a Sub-Bourdon—32-feet tone, or a Double Open Bass of 32 feet.

CHAPTER XXXV.

THE COMPOSITION OF THE MIXTURES.

1053. We have now arrived at the consideration of the composition of the Mixtures; that is, of the Compound Stops generally, under whatever name they may appear—as Sesqui-altera, Mixture, Furniture, Cornet, &c. This subject is one of great interest and importance. So great indeed is the influence which the class of Stops in question exercises, that, after taking the greatest care to preserve the Harmonic-corroborating series of Stops entire, and to secure the proper proportionate number of Stops of the different sizes, it is quite in the power of incorrectly compounded Mixtures to disturb those pre-arrangements, and to qualify the perfect effect of the work. For this reason, it becomes necessary to enquire what may be the several requisites of the class of Stops above named.

Why should there be breaks in a Compound Stop?

1054. The first question that presents itself is, *why* should there be any "breaks" in a Compound Stop? Because there is a practical difficulty in the way of continuing the smaller ranks throughout at the original altitude of pitch above the unison. It would be scarcely possible to make Pipes small enough for the purpose; and if made, they would be as difficult to tune. Moreover, they would be put out of tune again by the slightest change of temperature, or by the smallest particle of dust.

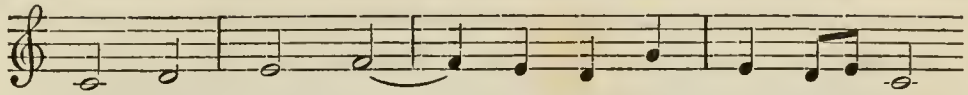
A Compound Stop without a break, not in accordance with the suggestions of nature.

1055. Moreover, there exists no *necessity* for continuing a Compound Stop up without a break. The Mixtures are intended to *corroborate* certain of the higher harmonic sounds; and these sounds are not heard to rise to so great an altitude when the Fundamental tone is higher up in the scale, as when it is lower down. For example—so long a series of harmonic sounds will not be traced rising above the middle c^1 as from the CC string of a Pianoforte. To continue a Compound Stop throughout, therefore, without a break, supposing it were practicable, would be to "corroborate" what cannot be heard.

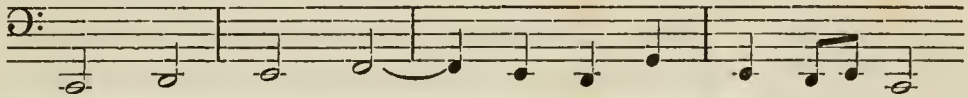
The same compound not productive of the same effect in different parts of the scale.

1056. Furthermore, there is a very important practical fact, connected with the sound of the small Stops of an Organ, that should here be mentioned. It is no other than this: that the same combination or compound does *not* produce the same effect in different parts of the scale, but appears to possess more prominence in the upper than in the lower part. For example—if the Great Organ Stops, as far as the

Fifteenth, be drawn, and this or any similar passage be played in the Treble,



a certain completeness of effect will be produced that will be satisfactory to the ear. Repeat the progression in the Bass,



and an equally perfect effect will not be experienced. The Mutation sound (Twelfth) will appear to be stronger than before; and, besides this, there will be a sensation of dulness as compared with the effect resulting from the previous experiment. If there be a 3-rank Sesqui-altera, and that Stop now be drawn; on repeating the same low notes, the Bass will be found to be brightened up, and the Twelfth-tone to be covered. If, however, the Treble of the added Stop be of *the same* composition as the lower part, and the foregoing passage be repeated in the higher part, the Treble will again appear to be in *advance* of the Bass, in regard to comparative brightness. These facts clearly show that there is a close connection between the extent of the audible harmonic series of sounds in nature, and the good effect of the harmonic corroborating Stops, when of approximate range. It is moreover evident, from their works, that the old English builders were aware of this, and that they worked accordingly, so far as circumstances permitted.

Might not a rank "die out," instead of presenting a break?

1057. The second question is, might not a rank, as its continuation becomes unadvisable or impracticable, be allowed to "die out?" No. For, in that case, the Treble, from having fewer Pipes, would sound weaker than the Bass, and consequently would be overpowered by it. To prevent this, the same number of ranks should be maintained throughout; and when it becomes advisable to discontinue a rank at its original altitude of pitch above the fundamental sound, a duplication of some larger rank should be introduced in its stead; which, by strengthening one of the most important *remaining* tones, will add fresh energy to that tone, and so partly compensate for the loss of *extent* in the harmonic series.

The valuable aid rendered to the Treble of an Organ by the return ranks.

1058. These duplications, introduced where the breaks occur, and increasing as the harmonic series decreases, perform a most important and valuable office, when rightly managed. It has already been mentioned more than once in the course of this work, that there is always a tendency in Organ Stops to become weaker and of lighter tone in the Treble than in the Bass. The duplications in question offer one means for almost entirely removing this defect from Organs of average dimensions; which they do by presenting a great accession of tone to the ranks that are "repeated," although they do not exactly double their power. These advantageous duplications of course alter the proportions as to the number of Stops and ranks of different sizes *in the Treble*, which modification takes place without any detriment, but, on the contrary, improvement to the general effect. The two chief rules to be observed in regard to the Treble, are (1) that, of the Foundation ranks, those of a smaller size shall never *exceed* those of

a larger, as more Fifteenths than Principals; and (2) that those of a Mutation rank must not be greater than those of the Foundation rank next below, as more Twelfths than Principals, or more Nineteenths than Fifteenths, &c. The more nearly the return ranks present a general duplication of the entire Treble, the better. The reinforced Treble then more nearly matches, in strength, the brighter Bass.

On what keys the breaks had better take place.

1059. The breaks, then, being not only unavoidable, but even *advantageous* when judiciously managed, the next question is, on what keys they had better be made. For these changes no fixed positions were recognised by the old builders; nor have any been uniformly adopted by the modern. They are met with on c, c sharp, f, f sharp, and g, in different Organs. As, however, c is viewed as the normal note of the Organ for most other purposes, the key so named in each octave would appear to be the most appropriate seat for the returns or breaks in the Compound Stops, provided it can conveniently be rendered so. This it has in the great majority of instances been made, with excellent effect; and it is therefore in most cases also retained for the same purpose in the following plans for Compound Stops.

Where the broken ranks should return to.

1060. The next point to be considered is, where should the broken ranks return to? Seidel says, "in the repetition of a Mixture, Fifths and Octaves must be used alternately." This refers to the Compound Stops of many modern Continental Organs tuned on Equal Temperament, in which there either are no Tierces, or they are made to draw separately. Smith sometimes broke his Mixtures by Octaves in the Bass; and used Fifths, Thirds, and Octaves successively in the Treble, England and Green more frequently used Fifths as well as Octaves for the breaks in the Bass; and Fifths, Thirds, and Octaves alternately in the Treble. But, in whatever way the breaks be made, the consequent duplication should be introduced with the view of preserving the predominance of the Foundation-tone, and the subordination of the Mutation.

1061. These precautions used not to be uniformly taken; hence certain mis-proportions will sometimes be met with in the old Mixtures of even some of the best builders. For example—in some old Organs there will be found, in the Tenor octave, to three Unison Flue Stops, one Principal and *two* Twelfths; the Fifth-sounding ranks being in consequence more numerous than the Octave-sounding ranks the next below them in pitch: and from middle c^1 upwards to two Principals, three Twelfths and one Fifteenth—the mis-proportion being thus increased. When the sound of the Mutation ranks is strengthened beyond the necessary degree, it then no longer simply gives roundness to the tone, but imparts a slightly nasal quality to it, that has nothing to do with the production of the peculiarly rich and mellow tone that so frequently distinguishes the old Mixtures; but, on the contrary, it to some extent deteriorates it.

1062. In one Organ the writer examined not very long since, there were in the Treble of the Great Organ, to

1 Open Diapason—2 Principals—3 Twelfths—and 4 Fifteenths.

The tone was amazingly bright, on account of the Fifteenths being so much more

numerous than the Principals and Diapasons; but the fundamental sound was far from being properly maintained. In another there were, to

3 Principals—2 Twelfths—2 Fifteenths—3 Tierces, and 4 Nineteenths.

In this case, the "Chorus" was anything but brilliant, although there was a great quantity of it, but rather was thick and indistinct, on account of the Tierces and Nineteenths being more numerous than the octave sounds immediately above and below them. On the Mixtures last referred to being subsequently revised, and the Foundation and Mutation ranks brought into better proportion, their power and clearness were considerably increased, without a single rank being added to the original number.

Plans for Compound Stops.

1063. Some compositions for Mixtures will now be given, in the preparation of which special care has been taken to guard against the appearance of any of the misproportions already alluded to. Advantage has also been taken of a personal examination of some of the finest English and Continental Mixtures, the best points in which have been freely incorporated, so far as the proposed number of ranks would in each case allow. As, however, two Mixtures of even the same number of ranks will produce a very different effect according to their composition, the one giving a sharp and clear tone, the other a full and bold tone; the terms "Full Mixture" and "Sharp Mixture" have been used, after the German manner. The term "Mixture" has also been applied alike to all the Compounds; for which, however, any other name would of course be substituted that might be preferred.

1064. The first kind of Compound Stop that is required for a small Organ, is one that will brighten up the Bass and Tenor, and add fulness, body, and firmness to the Treble, without, however, imparting sharpness or keenness thereto. The kind of Stop that is usually proposed for this purpose is a 3-rank Sesqui-altera, consisting of 17—19—22 in the Bass and Tenor octaves; and 12—15—17 from Middle c^1 upwards. Almost the only fault to be found with this composition is, that it places two Twelfths to one Principal in the Treble. This misproportion would be entirely removed by arranging the composition thus:

I. COMPOSITION FOR A FULL MIXTURE OF III RANKS.

Key on Manual.	Intervals in relation to the Unison.		The corresponding sounds in Tablature.
CC to middle b	15—19—22.	———	c^1—g^1—c^2.
Middle c^1 to the top.	8—12—15.	———	c^2—g^2—c^3.

1065. This alteration is effected entirely by substituting some other rank for the Tierce; which latter might be added as a separate Stop, if thought desirable. The Fifteenth gives increased clearness to the Bass, while the Principal adds to the fulness of the Treble. The above composition is in frequent use among German Organ-builders, and produces an admirable effect: the Furniture in Mr. Hill's Organ at the Panopticon is also compounded as above.

1066. The goodness of a Mixture composition depends, as already explained, on the extent to which the predominance of the foundation tone and the rules of proportion are preserved, when its ranks are added to the other Flue Stops of the same Manual. Let the above composition, then, be tested in this manner. Suppose it to be added to a small Organ, such as that proposed as the First Specification immediately preceding the Appendix. The proportion in the size of the Stops as there given is as follows:

3 Unisons—2 Octaves—1 Twelfth—and 1 Super octave throughout.

With the above addition, it would stand thus:

From CC to Middle b... 3 Unisons—2 Octaves—1 Twelfth—2 Super octaves—19 and 22; and

From Middle c^1 to the top. 3 Unisons—3 Octaves—2 Twelfths—2 Super octaves.

1067. For a somewhat larger Organ, such as our Specification No. IV, a 4-rank Mixture would be required. This might be of the following compound:

II. COMPOSITION FOR A CLEAR MIXTURE OF IV RANKS.

Key on Manual.	Intervals in relation to the Unison.		The corresponding sounds in Tablature.
CC to Middle b.....	19—22—26—29.	———	g^1—c^2—g^2—c^3.
Middle c^1 to b^1 above.	12—15—19—22.	———	g^2—c^2—g^3—c^4.
Treble c^2 to the top ..	1— 8—12—15.	———	c^2—c^3—g^3—c^4.

1068. The duplication of the four principal ranks of the Organ from Treble c^2 upwards (an octave and a half) imparts great breadth and dignity to the upper part of the Manual. The Sesqui-altera in the Organ at the Stockport School-room, by Kirtland and Jardine, is compounded as above.

1069. If a keener tone should be required, the compound might have the following form:

III. COMPOSITION FOR A SHARP MIXTURE OF IV RANKS.

Key on Manual.	Intervals in relation to the Unison.		The corresponding sounds in Tablature.
CC to Middle b.....	19—22—26—29.	———	g^1 —c^2 —g^2 —c^3.
Middle c^1 to Treble f^2.	12—15—19—22.	———	g_2 —c^3 —g^3 —c^4.
Treble $f^2\sharp$ to b^2 above.	8—12—15—19.	———	$f^3\sharp$—$c^4\sharp$—$f^4\sharp$—$c^5\sharp$.
c^3 in alt. to the top...	1— 8—12—15.	———	c^3 —c^4 —g^4 —c^5.

1070. As compared with the preceding composition, the above presents a *two-fold* contrast from Treble c^2 to b^2 in alt—nearly a complete octave. In the first half of that octave it has a 19 and 22 in place of the Open Diapason and Principal ranks before proposed; and in the second half octave, nearly, it has a 19 in lieu of the Open Diapason.

1071. In both the above schemes, the same unbroken composition is preserved through the Bass and Tenor octaves. The upper rank, however, might have been

changed at Tenor c; and at Treble c^2 the 22nd might have been discontinued, leaving the 19th at top. These modifications would have caused the composition to stand thus:

IV. COMPOSITION FOR A QUINT MIXTURE OF IV RANKS.

Key on Manual.	Intervals in relation to the Unison.	The corresponding sounds in Tablature.
CC to Tenor b.....	19—22—26—29.	g^1—c^2—g^2—c^3.
Tenor c to Middle b...	15—19—22—26.	c^2—g^2—c^3—g^3.
Middle c^1 to Treble b^1.	12—15—19—22.	g^2—c^3—g^3—c^4.
Treble c^2 to b^2 above..	8—12—15—19.	c^3—g^3—c^4—g^4.
c^3 in alt. to the top...	1— 8—12—15.	c^3—c^4—g^4—c^5.

1072. A break here occurs on every c key throughout the scale; and the Octaves and Fifths are discontinued alternately, after the manner proposed by Seidel. The changes are therefore very gradual. In some respects this composition resembles that frequently adopted by England, who was very partial to the 26th as the top rank in the Tenor octave; and sometimes in the Bass octave also. In connection with the discontinuance of the Octave Fifteenth at Treble c^2, it may be mentioned, as a circumstance worthy of observation, that the tone of that particular rank has a decided tendency to fall on the ear with great prominence above that note, unless it be very carefully treated, and well balanced.

1073. If a very full tone be desired from the Mixture, the following composition would produce that effect.

V. COMPOSITION FOR A FULL MIXTURE OF IV RANKS.

Key on Manual.	Intervals in relation to the Unison.	The corresponding sounds in Tablature.
CC to Tenor b.....	15—19—22—26.	c^1—g^1—c^2—g^2.
Tenor c to Middle b ..	12—15—19—22.	g^1—c^2—g^2—c^3.
Middle c^1 to the top..	1— 8—12—15.	c^1—c^2—g^2—c^3.

1074. At Tenor c this composition is exactly like that adopted by Green in the Organ at Rochester Cathedral, excepting the omission of the Tierce; and the Treble is also the same as that planned by that builder for the same instrument, excepting the same omission and the substitution of the unison rank in its stead.

1075. Let these several IV-rank Mixtures now be tried in the manner prescribed in an earlier part of this chapter. The Great Organ in Specification No. IV would have, without the Mixture, Reed, and Double,

3 Unisons—2 Octaves—1 Twelfth—and 1 Super octave throughout.

With the clear Mixture of IV ranks, it would have,

From CC to Middle b.....3 Unisons—2 Octaves—1 Twelfth—1 Super octave—19—22—26—and 29;

From Middle c^1 to b^1 above.3 Unisons—2 Octaves—2 Twelfths—2 Super octaves—19—and 22; and

From Treble c^2 to the top...4 Unisons—3 Octaves—2 Twelfths—and 2 Super octaves.

With the Sharp Mixture of IV ranks, it would have,

From CC to Middle b.....3 Unisons—2 Octaves—1 Twelfth—1 Super octave—19—22—26—and 29.

From Middle c^1 to Treble f^2.3 Unisons—2 Octaves—2 Twelfths—2 Super octaves—19—and 22.

From Treble $f^2\sharp$ to b^2 in alt..3 Unisons—3 Octaves—2 Twelfths—2 Super octaves—and 19.

From c^3 in alt to the top....4 Unisons—3 Octaves—2 Twelfths—and 2 Super octaves.

With the Quint Mixture of IV ranks, it would have,

From CC to Tenor b.....3 Unisons—2 Octaves—1 Twelfth—1 Super octave—19—22—26—and 29.

From Tenor c to middle b...3 Unisons—2 Octaves—1 Twelfth—2 Super octaves—19—22—and 26.

From Middle c^1 to b^1 above.3 Unisons—2 Octaves—2 Twelfths—2 Super octaves—19—and 22.

Erom Treble c^2 to b^2 in alt..3 Unisons—3 Octaves—2 Twelfths—2 Super octaves—and 19.

From c^3 in alt to the top....4 Unisons—3 Octaves—2 Twelfths—and 2 Super octaves.

With the Full Mixture of IV ranks, it would have,

From CC to Tenor b.....3 Unisons—2 Octaves—1 Twelfth—2 Super octaves—19—22—and 26.

From Tenor c to Middle b...3 Unisons—2 Octaves—2 Twelfths—2 Super octaves—19—and 22.

From Middle c^1 upwards ...4 Unisons—3 Octaves—2 Twelfths—and 2 Super octaves.

1076. We here see that the composition of a Mixture, consisting of a specified number of ranks, may be varied in many different ways, to adapt it to special purposes, or to cause it to suit individual tastes or feelings, and yet without creating any misproportion in any one instance. For a V-rank Sharp Mixture, the following composition would answer well:

VI. COMPOSITION FOR A SHARP MIXTURE OF V RANKS.

Key on Manual.	Intervals in relation to the Unison.	The corresponding sounds in Tablature.
CC to Middle b.....	15—19—22—26—29.	c^1 —g^1 —c^2 —g^2 —c^3.
Middle c^1 to Treble $f^2\sharp$.	8—12—15—19—22.	c^2 —g^2 —c^3 —g^3 —c^4.
Treble $f^2\sharp$ to b^2 in alt.	1— 8—12—15—19.	$f^2\sharp$—$f^3\sharp$—$c^4\sharp$—$f^4\sharp$—$c^5\sharp$.
c^3 in alt to the top....	1— 5— 8—12—15.	c^3 —g^3 —c^4 —g^4 —c^5.

1077. In the Bass and Tenor octaves the above composition is identical with that used by Harris in the fine Organ at Doncaster, lately destroyed, excepting that

a 15 is substituted for the octave Tierce. The composition from Middle c^1 to Treble f^2 is also the same, with the exception of the substitution of a 22nd for the Tierce. The Fifth at c^3 in alt, introduced after the manner common in German Mixtures, should be scaled and voiced as a Dulciana, when the Double is a Bordun. It is a noteworthy fact, that scarcely any of the old Organs contain a 22nd in the Treble, even when there are as many as six ranks of Mixture. The writer has not met with it in the Treble of any of the Organs by Smith, Harris, Snetzler, or England, that have come under his notice; and he has only met with it in one of Green's, namely, that in St. Katherine's Church, Regent's Park, and there it stops at Treble c^2.

1078. The omission of the 22nd from the Mixture compound in the Treble of old Organs, and the occasional appearance of the misproportion in that part of those instruments, seem to have arisen from three causes; (1) the omission of Doubles, which deprived the Treble of all depth of tone, and so prevented its successfully resisting the upward-directing influence of the octave Fifteenth; (2) the non-return of any Mixture rank to the unison tone, which further militated against the effectual balancing of the acute rank in question; and (3) the comparatively few intervals left to which the broken ranks could return, and which therefore were certain to be thrown out of proportion with the unison the more they were doubled.

1079. In the Organ at Newcastle on Tyne, built by Renatus Harris, and also in that at Halifax, by Snetzler, an Open Diapason rank, however, as well as a Principal, is comprised in the Mixture compound, in the Treble.

1080. In compounding two separate Mixtures, the same attention should be paid to the preservation of the proportion in the Bass, and the regular duplication of the ranks in the Treble, that has already been bestowed on the single Mixtures.

VII. COMPOSITIONS FOR

	a Full Mixture, III ranks,	—	and a Sharp Mixture, III ranks.
CC to Middle b.....	15—19—22.	———	22—26—29.
Middle c^1 to b^1 above	8—12—15.	———	15—19—22.
Treble c^2 to f^2 above	1— 8—15.	———	12—19—22.
Treble $f^2\sharp$ to b^2 in alt	1— 8—15.	———	12—15—19.
c^3 in alt to the top.....	1— 8—15.	———	8—12—15.

1081. Although it is true indeed that the octave Twelfth and octave Fifteenth sounds cannot be traced among nature's suggestions in the higher parts of the musical scale, yet those tones have a wonderfully fine effect in the Treble of an Organ, when they are well balanced. Moreover there are several arrangements which will aid in bringing those acute sounds into due subordination, without the two ranks which produce them being voiced weakly; as, for instance, the duplication of their octaves below, i. e. of the Twelfth and Fifteenth, which will be found to occur in all the best modern Mixtures, as well as in the old; the presence of a 4-feet or second Principal rank, which however is met with more frequently in old Organs than in modern; and more particularly the insertion of a Sub-octave sounding Stop, which is always found in new Organs of pretension, and never in old. These, in connection with the usual

proportion of Stops—as, for instance, those in Specification No. VIII—would produce so great a body of tone that there would be little chance of the 19 and 22 predominating in the Treble octave. At Treble c^2, where the 22 begins to produce an effect of remarkable acuteness—a fact, no doubt, observed by Green, as he discontinued that rank on the very next note, after completing the octave—an Open Diapason rank might be introduced, as suggested in the Full Mixture of the preceding composition; which, in conjunction with the Double, would certainly tame down that otherwise noisily inclined rank.

VIII. COMPOSITIONS FOR

a Full Mixture, III ranks, — and a Sharp Mixture, IV ranks.

CC to Middle b.....	15—19—22.	———	19—22—26—29.
Middle c^1 to b^1 above.....	8—12—15.	———	12—15—19—22.
Treble c^2 to f^2 above.....	1— 8—15.	———	12—15—19—22.
Treble $f^2\sharp$ to b^2 in alt.....	1— 8—15.	———	8—12—15—19.
c^3 in alt to the top	1— 8—15.	———	1— 8—12—15.

1082. On examining the above compounds, it will be seen that *either* of them could be used separately with the larger Stops as far as the Fifteenth, according as a full or a ringing tone might be required, without any lapse appearing in the progression; while *both* could be united for a third and fuller effect, without any misproportion occurring. This idea is taken from some of the Continental Mixtures. The separate Tierce, moreover, could be drawn with either of them, and thus the usefulness of that rank be doubled without its being repeated, which, in an equally tempered Organ, would have a most offensive effect.

IX. COMPOSITIONS FOR

a Full Mixture, III and IV ranks,—and a Sharp Mixture, V ranks.

CC to Tenor b	15—19—22.	———	15—19—22—26—29.
Tenor c to Middle b.....12—	15—19—22.	———	15—19—22—26—29.
Middle c^1 to Treble f^2	1— 8—12—15.	———	8—12—15—19—22.
Treble $f^2\sharp$ to b^2 in alt	1— 8—12—15.	———	1— 8—12—15—19.
c^3 in alt to the top	1— 8—12—15.	———	1— 5— 8—12—15.

1083. It may be as well, before proceeding further, to explain why one of the most generally received names for a Compound Stop—that of Sesqui-altera—has not, in the foregoing schemes, been retained.

1084. The Continental Sesqui-altera, from which the English Stop was originally derived, is a II rank Mutation Stop, composed of a Fifth and a Third-sounding rank; the Fifth being the lowest, and the Third the highest; the two thus sounding a major sixth—as g—e^1 on the CC key,—hence the name Sesqui-altera, from Sexta, a sixth. The size of the two ranks was usually $2\frac{2}{3}$ feet and $1\frac{3}{5}$ foot, which therefore corresponded exactly with the English Twelfth and Tierce. Sesqui-alteras of this kind will be found in the Great and Positif departments of the Rotterdam Organ (Foreign Specifications, No. 2); also on the Choir Manuals of the

Organs at Amsterdam (Foreign Specifications, No. 5); the Hague (Foreign Specifications, No. 8); Freiburg (Foreign Specifications, No. 37); Frankfort Cathedral (Foreign Specifications, No. 39); &c. When the Sesqui-altera consisted of III ranks, a Fifteenth was frequently added to the Twelfth and Tierce, making it sound g—c^1—e^1; and it was in this form that the Stop was introduced by Smith and others into the Treble of their English Organs. Sometimes the Sesqui-altera consisted of IV ranks, in which case a Principal was usually incorporated. This is the form in which the Stop stands in the Treble of Snetzler's excellent Organ at St. Mary's, Nottingham.

1085. Another II rank Mutation Stop used frequently to be admitted into Continental Organs, called a Tertian—from Tertia, a third. This consisted of an *inversion* of the two Sesqui-altera ranks; that is to say, the Fifth-sounding rank was the smallest, and therefore the highest in pitch. The two ranks thus sounded a third, as e^1—g^1 on the CC key, and therefore agreed precisely with the Tierce and Larigot of English Organs. A Tertian of II ranks occurs on the Great Manual of the Haarlem Organ. (See Foreign Specifications, No. 1.)

1086. It will be seen, however, that the two Stops in question were named after the interval which their own two distinctive ranks conjointly produced, without reference to the relation in which they might stand to the fundamental tone of the Organ; and in this respect they differed from all the other Stops in the Organ-builder's vocabulary. In fact, the Sesqui-altera was, in a few cases, simply labelled "Sexta;" as on the Great Manual of the Organ at Mülhausen (Foreign Specifications, No. 49); and on the same department of that in the Church of St. Dominico, at Prague (Foreign Specifications, No. 85). A third Stop, of II ranks originally, and mostly composed of a Twelfth and Fifteenth on one slider, used also to be frequently introduced by German Organ-builders, under the name of Rausch-quint, or Rausch-pfeif. (See Foreign Specifications, Nos. 65, 66, 85, 91, 92, &c.) This Stop is still in use. In English Organs, until recently, the first III rank Compound Stop usually disposed, and called Sesqui-altera, was really one of that nature from Middle c^1 upwards—namely, 12—15—17; but from that note downwards it was essentially a Mixture of III ranks—namely, 17—19—22. To the Sesqui-altera composition in the Treble, many modern Organ-builders and Organists have latterly taken great exception; some proposing to substitute in its stead a continuation of the 19 and 22 through the next octave and a half—thus forming a sort of III rank Sharp Mixture—while others suggest the introduction of a Principal in place of the Tierce, after the manner of the III rank Full Mixture already given. Both the compositions recommended remove almost every vestige of the original Sesqui-altera, even from the only half of the Manual range in which it ever appeared in English Organs; and on this account it becomes a subject well worthy of consideration whether the name should continue to be applied to a Stop to which it is no longer in the least degree appropriate. Following the modern German custom, the name was relinquished with the composition in the plans for Mixtures just now proposed; and other names were adopted, which very simply yet most clearly announce, even to the uninitiated, what are the distinctive properties of each; as "Full Mixture," and "Sharp Mixture." The only deviations from the Continental nomenclature consist in the addition of the adjective "full" to the *largest* Mixture;—which appeared to be necessary, inasmuch as fulness of tone is by no means a common attribute of an

English Mixture, although it is one of the leading characteristics of a German one, in the Treble;—and in the addition of the word "Mixture" to that of "Sharp," to intimate that such a Stop *is* a Stop of that kind; a fact known sufficiently well abroad to be understood without the announcement being placed on the Stop-label, but which probably would not be so at first in this country, supposing that name to be adopted.

1087. One of the chief objects for which the Sesqui-altera was originally used abroad, was to place a second Twelfth on the Manual of those large instruments in which the Mixture ranks were sufficiently numerous to require it to bind their tone more firmly to the large work of the same Manual. (See Foreign Specifications, Nos. 1, 2, 4, 46, 50, &c.) In the modern instruments of German builders, from which the Stop in question is mostly omitted, the second Twelfth is usually incorporated with the "Full Mixture," as illustrated in the IXth Composition already given. That plan might be followed for new Mixtures; or, if the introduction of a separate and genuine Sesqui-altera were desired, this would be well secured by arranging the composition after the following manner:

X. COMPOSITIONS FOR

	a Sesqui-altera, II ranks,	a Full Mixture, III & IV ranks,	and a Sharp Mixture, V ranks.
CC	12—17. ——	15—19—22. ——	15—19—22—26—29.
Middle c^1	12—17. ——	1— 8—12—15. ——	8—12—15—19—22.
Treble $f^2\sharp$	12—17. ——	1— 8—12—15. ——	1— 8—12—15— 19.
$\bar{c}^3$ in alt	12—17. ——	1— 8—12—15. ——	1— 5— 8—12—15.

1088. The Tierce, or second rank of the Sesqui-altera, is, in modern German Organs, usually incorporated with the Sharp Mixture, and not the Full Mixture—i. e. with the *second* Compound Stop, and not the *first;* and for this reason: When the unequal temperament was in vogue abroad, the pure thirds in the common scales so nearly accorded with the Third-sounding rank of the Mixtures, that the latter effected a direct improvement on the general tone of the Organ. On the equal temperament, however, being adopted, and the consequent sharpening of the thirds on the keys, the Tierce was found to harmonise less agreeably than before; hence arose the plan of not introducing a Third-sounding rank so soon as had previously been the custom. Five ranks of Mixture thus came to be generally proposed without a Tierce; and in its stead a duplication of the Fifteenth was usually introduced, which materially added to the distinctness and the silvery character of the Mixture-sound. And it may be mentioned here, that the superiority of a Mixture, having a few ranks, without a Tierce, over one including a Tierce, may be interestingly exemplified on Mr. Hill's Organ at the Panopticon, the Mixtures of which are of the following compounds:

Furniture, III ranks.	Sesqui-altera, III ranks.	Mixture, III ranks.
15—19—22. ——	17—19—22. ——	24—26—29.

by trying the larger Stops first with the Furniture, then with the Sesqui-altera.

1089. With regard to the incorporation of the Tierce with the Sharp Mixture, this Continental custom was not followed in the preparation of the foregoing schemes, because in England the prevailing feeling is at present more frequently in favour of the

early use of the Tierce than not; therefore by leaving it to be disposed as a separate Stop, it could be drawn either with the first Mixture or not, according as the taste of the Organist might dictate.

1090. There is another German Compound Stop, sometimes met with in large Organs, that might here be noticed, called the Cymbal. This frequently consists of a duplication of the two or three upper ranks of the Sharp Mixture, with sometimes an octave Tierce added. In connection with a Stop of this kind it may be mentioned, that when the Mixtures ascend very high, and are particularly strong in the Tenor octave, there is always a danger of the Treble being overpowered and obscured by them; and it is then that Cavaillé's admirable increasing pressure system is so useful. For the Treble Reeds of large Organs the heavy pressure system is invaluable. The tendency to weakness as the scale ascends was observed by the Dutch and German builders, nearly two centuries since, who proceeded to rectify it by furnishing the leading Manual Stops of their Organs with two Pipes to a key from Middle c, Fiddle g, or even Tenor C upwards; and also by increasing the number of ranks in the upper part of the Mixtures, as at Haarlem, Rotterdam, Amsterdam, Hamburgh, &c. The increasing pressure system attains the same end without such reduplications. The necessary repetitions which occur in the Treble of the Mixture Stops exercise a material influence in that direction, and the powerful wind does the rest. At the same time, all the proportions which have already been detailed, and the duplication of all larger ranks before smaller must be duly observed, otherwise it is not in the power even of a heavy wind to secure a well-balanced effect.

1091. No compositions for a Mounted Cornet are here given; as the purpose which that Stop was originally designed to fulfil is so much better attained by other Stops in modern English Organs. The Mounted Cornet was originally used for giving out the melody of a Chorale upon; and hence was usually only a Treble Stop in English instruments; but in Germany, where the Canto Fermo is frequently announced in the Tenor, a la Bach, it generally descends to Tenor C. In modern English Organs the Clarionet in the Choir, and the Reeds in the Swell, together, offer so many ways of giving out a melody prominently, either as the upper or an inner part, that for its original purpose the Mounted Cornet has become quite obsolete.

1092. In regard to scale, the Mounted Cornet was larger than the Open Diapason; the Principal and Twelfth ranks being three Pipes larger, and the Fifteenth and Tierce two Pipes larger.

1093. Herr Franz Weber, the excellent Organist of Cologne Cathedral, constantly uses the Mounted Cornet as an accompaniment to the priests' voices.

1094. As the Mixtures of many of the old English builders have been so frequently referred to in the present chapter, the composition of some of them may prove interesting to many readers, and are therefore subjoined.

SMITH.

(TEMPLE CHURCH.)

	Sesqui-altera, III ranks.		Mixture, III and II ranks.
CC	17—19—22.	———	22—26—29.
Tenor c♯	17—19—22.	———	19—22.
Middle c^1♯	15—17—19.	———	12—15.
Treble c^2♯	12—15—17.	———	12—15.
Treble f^2♯	8—12—15.	———	12—15.

HARRIS AND BYFIELD.

(DONCASTER CHURCH.)

	Tierce.		Sesqui-altera, V ranks.
CC to Middle b	17.	———	19—22—24—26—29.
Middle $c^1\sharp$ to the top	17.	———	8—12—15—17—19.

SNETZLER.

(ST. MARY'S, NOTTINGHAM.)

	Sesqui-altera, IV ranks.
CC to Fiddle g	15—17—19—22.
Fiddle g$\sharp$	12—15—17—19.
Middle $g^1\sharp$	8—12—15—17.

GREEN.

(ROCHESTER CATHEDRAL.)

	Sesqui-altera, III ranks.		Mixture, II ranks.
CC.....	17—19—22.	———	15—19.
Tenor c	17—19—22.	———	12—15.
Fiddle g.....	15—17—19.	———	12—15.
Middle c^1	12—15—17.	———	8—12.

GREEN.

(ST. KATHERINE'S, REGENT'S PARK.)

	Sesqui-altera, III ranks.		Mixture, II ranks.
CC.....	17—19—22.	———	22—24.
Fiddle g	17—19—22.	———	17—22.
Middle c^1	15—17—19.	———	17—22.
Treble c^2.....	12—15—17.	———	15—17.

ENGLAND.

(LANCASTER CHURCH.)

	Sesqui-altera, IV ranks.		Mixture, II ranks.
CC.....	17—19—22—26.	———	24—29.
Gamut G	17—19—22—26.	———	22—24.
Tenor c	17—19—22—26.	———	19—22.
Tenor f.....	15—17—19—22.	———	19—22.
Middle c^1.....	8—15—17—19.	———	15—19.
Middle f^1.....	8—12—15—17.	———	15—19.
Treble c^2	8—12—15—17.	———	12—15.

CHAPTER XXXVI.

THE EXTERIOR ARRANGEMENT OF THE ORGAN.

The Organ-Case.

1095. THE two great desiderata in an Organ-case—the one referring to its appearance, the other to its influence on sound—are, that it should correspond in style with the building in which it is erected, and that it should impede the egress of the tone as little as possible.

1096. The most appropriate style for a Church Organ-case, generally speaking, is one of the periods of the Gothic; because in some one of these the great majority of our finest Ecclesiastical edifices, both ancient and modern, are built. No authentic examples, however, of cases in this style of early date are known to exist in England. In Germany a few still remain. One of the most beautiful is in the "Marien-Kirche" at Lübeck, at the west end of the building. It consists of three main compartments, flat; the centre one being the largest, and containing the 32-feet tin Pipe. The main compartments are separated by two subordinate ones, containing smaller Pipes. All the front Pipes are of pure tin, burnished, and slightly but exquisitely diapered about the mouth; and the Case, of some dark wood, has a great quantity of carved and gilt work about it, which gives a gorgeous effect to the whole. Underneath, it is groined, and handsomely illuminated and gilded.

1097. The oldest Organ-cases in England—those at Exeter, Shrewsbury, and Cambridge—are Italian in their detail. So also are those made by Smith and Harris, immediately after the Restoration. Literal copies of these are therefore unsuitable for Churches of Pointed design; even though the originals may stand in buildings erected in that style. Nevertheless, many of the specimens just referred to possess an air of great dignity, as well as considerable beauty and elegance of outline. Their various compartments are often very finely proportioned; while their relative sizes have been adjusted to each other with consummate judgment and taste. In most of the old Organs the largest Pipes of the original work, i. e. the lower Pipes of the Open Diapason, are almost always found in the front of the Case, in the Towers. They were originally placed there for two reasons: (1) to impart dignity to the general appearance of the instrument, and to secure for them plenty of speaking room. The larger the Pipe, the greater is the gust of wind emitted from its mouth; and consequently the more space must there be in the vicinity of the mouth to admit of the Pipe speaking clearly and firmly. By mounting the large Pipes in the manner already noticed, they not only had plenty of this necessary room, but, from the direction in which their mouths were turned, they could produce their sounds freely, without encroaching on the speaking room inside the case necessary to ensure the correct enunciation of the interior Pipe-work.

1098. In some modern Organs the case has been made with carved woodwork in front, instead of Pipes, giving the instrument a "shrine-like appearance." If a case of this kind is proposed—although it is not clear what may be the merit of making an Organ look like what it is not—additional space should be allowed inside for the accommodation of the dismounted Pipes; for if one Pipe be placed too near to the back or side of a second, so that its mouth becomes shaded, the tone of the former will become muffled and flattened in pitch; or, if the mouth of one Pipe be placed so near to that of a second, that, when both are made to speak, the current of air emitted from the one intersects that from the other, the tone will be false and tremulous. The Organ-builder's greatest care is required to guard against the appearance of these casualties, even when circumstances are most favorable; but when standing and speaking room have to be found inside for several additional and large Pipes, without the necessary extra space being allowed internally, the Organ-builder's difficulties, and the chances of the tone of the Organ being unequal, are most unnecessarily increased.

1099. The principle of arranging large Pipes with their mouths turned outwards has in several instances been carried farther by the modern Organ-builders than by their predecessors, and with equally good results. The Pedal-Organ is usually planted either at the back of the instrument, or it is divided into two portions, and a part arranged at each side of the Organ, just inside the case. When there is sufficient clear space outside the Organ-case in the vicinity of the Pedal-Organ, the larger Pipes of that department are often turned round and made to speak through openings or gratings in the case made for the purpose; as at St. Paul's Cathedral; Christ Church, Newgate Street; St. Olave's, Southwark; St. Peter's, Cornhill; &c. This plan is a very good one, not only because it prevents the possibility of the tone from the large Pipes being smothered and uncertain, but also because it admits of some of the other inside Pipes being planted close to them, back to back, as at St. Olave's, Southwark, whereby a great saving of room is effected.

1100. In a few instances the Organ-case has been made with Metal Pipes at both sides, as well as in front; as in the instrument at Croydon Church, built by Avery in 1794; and also in that at St. Katherine's Church, Regent's Park, by Green. Organs that are to stand on a central screen should have an east and west front, not simply for ornament, but to allow the tone to travel up and down the building.

1101. It would greatly add to the beautiful appearance of the Organ, as well as be beneficial to the quality of some of its tones, if the front Pipes were to be made of pure tin, and the natural lustre of the material be left unobscured; instead of their being formed of an inferior compound, and then gilded or painted. This improvement might be the more easily effected, since the sum necessary to defray the cost of gilding, &c. added to the value of the metal Pipes of lower standard, would be amply sufficient to secure substantial Pipes of the more handsome and durable material.

The Manuals and Pedals; their width; and their proper situation in regard to each other.

1102. The width for a Manual that ranges from CC to f^3 in alt, 54 keys, is 2 feet 6 inches. For the Pedal-board there is in England, at present, no fixed width; which is a circumstance much to be regretted. On this subject Dr. Burney wrote, eighty years ago, "Scarcely two Organs in the kingdom have their Pedals

alike, either with respect to number or position; so that every performer who comes to an Organ with which he is not previously acquainted (be he ever so skilful in the use of Pedals), has the whole of his business to learn again." The want of uniformity complained of by Dr. Burney, as existing in his time, remains in full force in the present day.

1103. The natural Pedal Keys should, if possible, be a good inch in thickness; about 20 inches in length, and from 2 to $2\frac{1}{2}$ inches in depth. If they are either too narrow, too long, or too shallow, they will have a tendency to spring. Their upper surface should not be much rounded off towards the sides; as in that case the foot would only touch the crown of the Pedal. The angles, however, would of course be bevelled off, to remove splinters, &c. The upper surface is sometimes rounded to assist the foot in slipping from one Pedal to the next; but this is reversing the order of things. The Pedal should be constructed to *retain* the foot steadily and firmly. It is the Organist's province to be able to change from one Pedal to its neighbour with facility, when necessary.

1104. The two great points to be observed in the construction of a good Pedal-board, are, that space shall be economised as far as is practicable, in order that as complete a compass as possible may be secured; and yet that the Pedals be not placed so closely that they can only be made of the thickness of mere sticks.

1105. A good medium scale is obtained by planting the Pedals so that the naturals measure $2\frac{1}{2}$ inches from centre to centre. This is the scale adopted by Mr. Hill, among other builders; and it admits of the introduction of a complete compass of Pedals without throwing the upper keys so much to the right as to be out of reach of the performer. In Germany the Pedals usually measure as much as from $3\frac{1}{8}$ to $3\frac{1}{4}$ inches from centre to centre; while in England they are as frequently placed too closely together.

1106. The Pedals are more agreeable to play upon when the naturals are about half an inch higher at the back (under the stool) than at the other end: the heel of the foot then sooner reaches the key. The upper part of the short Pedal Keys, which need not be more than five inches in length, are also the better for not being quite level. They should slightly incline upwards as they recede; leaving the front or lowest part about an inch above the neighbouring part of the naturals. When so shaped they meet the broad part of the foot more accurately. A frame should run across beyond the short Pedal Keys, to serve as a foot-rest; but *not* at the sides, as it would be in the way of the extreme keys.

1107. Several experiments have at various times been made with the view of bringing the Pedals more conveniently under the control of the performer. In the Organ at York Cathedral, erected in 1829, Mr. Hill made the Pedal-board on the radiating principle. In Germany, the Pedal-board is frequently made concave in shape, i. e. the Pedals to the extreme right and left are made to rise gradually in a curve.

1108. Lately, Willis of London, and Heinrich of Cologne, have been making Pedal-boards in which it has been the object to combine the peculiarities of the radiating with the concave principle.

1109. The Manual Keys should not be too short, otherwise the touch will be too shallow and too heavy. On the other hand, they should not be too long, other-

wise the touch will be too deep, and most likely also destitute of firmness. About $\frac{3}{8}$ of an inch is a very good and a fair average depth for the Great Organ Keys to fall. All the Manuals, however, seldom descend to exactly the same depth. The performer, nevertheless, soon accommodates himself to a rather deeper or slightly more shallow touch than the average one, or even to one that is a degree heavier or lighter than usual. The condition of the greatest importance to him is that, whatever be the general depth and resistance, all the Keys on a Manual shall be *alike in both these respects*. If one key requires more power than its neighbours to press down, or descends lower, or not so low, the playing is rendered more difficult by such vexatious inequalities. Check-springs are a prolific source of unequal resistance.

1110. A springy resistance of greater or less amount, according to circumstances, is all that the finger or foot should have to overcome. Unequal, stiff, or sluggish touches are all defective. A little allowance, however, may fairly be made in favor of lately renovated or newly constructed Organs. In new mechanism of all kinds there will be a little friction at first, in proportion to the accuracy with which it is made; and the mechanism of an Organ offers no exception to the rule. If the Key-movement works "too easy" at first, it may rattle after a few years' usage.

1111. When the Manual Couplers are drawn, the resistance offered by the chief Manual to the finger will of course be increased. The touch, however, should still preserve its *elasticity*. Sometimes a very disagreeable grating sensation is experienced by the finger, as though the Coupler-stickers were working through scouring-paper.

1112. With regard to the arrangement of the Manuals, the best and most generally received plan is that of placing the one belonging to the Great Organ in the middle; with that of the Swell three inches above, and that of the Choir as many inches below. Sometimes, to lessen the distance to which the upper Manuals recede behind the lower, the front of the Great Organ keys is made to project over those of the Choir about an inch; and those of the Swell to stand forward in the same manner and to the same distance over the Great Organ keys. There are two ways of doing this: either by making the beading in front of the keys take the form of an ogee projection; or by bevelling away the under side of the key, upwards, commencing about an inch from the front, as in the Birmingham and Panopticon Organs. The latter plan is the best, as the hands can then be raised from one Manual to the next without danger of striking the knuckles.

1113. For the Pedals, thirty-one inches below the Great Organ Manual will be found a most convenient position. The centre C of the Pedals—that is, the middle one of the three bearing that name—should be planted directly underneath the middle c^1 of the Manuals; and the front of the short keys should come just under the front of the Great Manual short or black keys.

1114. In many Organs the Pedals are placed too far from the Manuals, and often also too forward. The Organist should be able to use either of the three Manuals or the Pedals freely, without experiencing the slightest tendency to fall from the seat. This firmness of location and command over the instrument will be secured, if (1) the Pedals are placed at twenty-eight inches from the Choir Manual, with the front of the short keys placed as already described; (2) if the stool be arranged at a distance of twenty-two inches above the Pedals; and (3) if the stool be placed about six inches in front of the Choir Manual.

1115. When seated at the Organ, the feet should be suspended immediately in front of the short Pedals. If, when seated at a distance of twenty-two inches above the Pedals, the Manuals appear too high—or if, on increasing the height of the stool so as to bring the Manuals more under command, the feet are too far from the Pedals, it is a proof that the Pedals are at too great a distance from the Manuals. If, after placing the Organ-stool in such a position as will allow of the free use of the Pedals, the Manuals are too far off—and if, on adjusting it so that the Manuals are within convenient reach, the feet hang over the short Pedals—this shows that the Pedal-board is much too forward.

The Organ-stool.

1116. It adds much to the comfort of playing if the top of the Organ-stool be made of a good width, as it enables the player to sit with so much more firmness at the instrument. For this purpose it should be made about fourteen inches in width, and should *not* incline downwards towards the front, as this has a tendency to make the player slip forward when actively employed. For the same reason it is better not to cover the seat with a smooth substance, as certain kinds of leather, or horse-hair cloth; but simply with either a piece of carpet, or with rough leather, with a *little* stuffing. The plain wood is often left for the top. In such cases, it is much better for it not to be polished.

1117. In the top of the stool one or two drawers can be conveniently introduced, which are always useful to hold music or books. A rail across, under the stool, from end to end, about four inches above the Pedals, and five or six inches from the front, will be found a great convenience for resting the feet upon; as the frame under the Composition Pedals is too far off for constant use.

The Swell Pedal.

1118. The Swell Pedal is not at all times conveniently placed; it frequently being too high and too forward. About seven inches above the Pedal-board will be found a very convenient position for it. Sometimes it is so arranged that when the Swell is fixed open it *crosses* the upper short keys of the Pedals. This, of course, is not good. It might conveniently be made to project parallel with the Composition Pedals, so as to meet the foot, instead of through the jamb; and in such a position that when fixed down it would lie over some place where two naturals come together; as, for instance, over the upper e and f of the Pedals. On fixing open the Swell, it would then be far less in the way of the Pedals than it frequently is when it projects from the side.

1119. When the Swell Pedal projects from the side, and the leg has to be turned out so much before the Pedal can be got at that the position of the body at the keys becomes disturbed, it is a proof that the Pedal is too forward. If the thigh-joint as well as the foot has to be raised before reaching the Pedal, it is an indication that the latter is too high. Sometimes the Organist has to throw his body backwards in order to preserve his equilibrium; or to place his thumbs on the beading in front of the keys, to prevent his falling forward. Either inconvenience is the consequence of some misarrangement in the region of the keys. Either the Swell Pedal will prove to be too high or too forward; or the Stool or Pedals will be too low or too forward,

The Music-desk.

1120. It is a matter of great convenience to have the Music-desk properly adjusted. When there are three Manuals, the desk should not be farther back than the front of the Swell Keys, and it may be placed nearly as forward as the front of the Great Manual. It is a great fault if the desk is placed at the back of the Swell Keys, as, from this cause, the Music is needlessly carried five or six inches farther from the Organist than there is any occasion for, and nearly as much too low also; thus rendering it necessary that he should look *down upon* the Music, instead of *forward at* it.

The Composition Pedals.

1121. The Composition movement should be of the "double-action" kind. The Pedals which operate upon them are sometimes made to project in a line with and just above the German Pedals; at other times from the sides, like so many long Swell Pedals. The former is not only the most neat, but the most convenient arrangement. It is a good plan to place the Composition Pedals immediately over where two naturals come together, as there is then no chance of the heel touching a short key when either of them is being pressed down. The Composition Pedals should not remain down so as to be in the way of the short Pedal Keys.

The arrangement of the Draw-Stops.

1122. The Draw-Stops should be so placed that they will not only be under the convenient control of the player, but also present a handsome and symmetrical appearance.

1123. In many of the old English Organs half the Stops belonging to each department are arranged on each side of the Manuals. A great number of the German and other Continental Organs also have their Stops assorted in a similar manner. The plan, however, is not by any means a good one, as it apportions the Stops into twice as many divisions as there is any occasion for, without serving any beneficial result.

1124. A far better arrangement is the modern English one of placing all the Stops of each department together, as the contents of each division can then be so much more easily distinguished from the rest.

1125. Besides keeping them separate, as above, the Stops of each department should further be placed where they can be combined or changed with the least difficulty to the performer. With a view to the attainment of this end, it is important to bear in mind the two following facts: (1) that, as a rule, the left hand can be more easily spared for a moment than the right; and (2) that the Great Organ Stops are more frequently brought under the control of the feet of the performer by means of Composition Pedals than those of any other department.

1126. The right-hand side is therefore the best side on which to place the Great Organ Draw-Stops, as they can be drawn in or out, in all the ordinary and most frequently required combinations, without any assistance whatever from the hand.

1127. The Swell and Choir Organ-Stops are not nearly so often acted upon by Composition Pedals. Moreover, as the numerous delicate shades and varieties of tone are produced from those departments chiefly—leaving the Great Organ for the broad contrasts—the left side appears the most proper one whereon to place their Draw-

Stops. As the Bass part of the Music can be continued by the Pedals, the left hand can, with a little contriving, be for a moment spared for effecting the necessary changes in the combinations, without in the least degree disturbing the progress or completeness of the Music.

1128. The Pedal Organ-Stops and the various *Manual* Couplers might be placed on the right-hand side, with a view to securing as nearly as possible an equal number of Stops on both sides of the keys, which is always desirable. But the *Pedal* Couplers should, whenever practicable, be ranged on the left-hand side, to facilitate the making of those quick changes from one Manual to another that are so constantly required in accompanying the Musical Service, as well as in Solo-playing.

1129. If there is a large Pedal Organ, it will be advisable to have some contrivance for reducing the full Pedal Organ to a few 16 and 8 feet Flue Stops of soft intonation, to form a Pedal Bass to the Choir or Swell. This can either be a Composition Pedal, or, by placing all the louder Stops on a second Sound-board, and introducing a valve into the second Wind-trunk—as is ordinarily done in small English Organs which have only "Pedal Pipes" by way of Bass—they can then be silenced by shutting off the wind. A third plan would be to have a movement, worked by the hand or foot, to disconnect the action of the loud-stop Sound-board from the Pedal. If a "Ventil" be introduced, and it be intended to work it by the hand, the handle should be placed near to the Great Pedal Coupler, that both may be changed together.

1130. In arranging the places for the several Stops of any one department, it is best, first, to keep the Reed and the Flue-Stops quite separate. The Reed Stops should be placed above, and the Flue Stops below.

1131. Next, the members of the different classes of Stops should be arranged according to their standard length or their size of tone; giving to the largest the lowest positions, and the smallest the highest. According to this rule, all the Flue-Stops of 16 feet on the Manual, as being usually the largest, should occur at the bottom, with those of 8 feet next; and so on through the series in regular gradation. And the same with the Reeds. The disposition of even a large Organ may soon be learnt, as well as the places where the several Draw-Stops are to be found, when the latter are arranged in a methodical and intelligible manner. As an example, the size and comparative completeness of any of the German Organs described in the Appendix, may at once be ascertained from a perusal of the list of its contents arranged in the simple manner there given.

1132. The several Draw-Stops are generally arranged in single, double, or triple *vertical* rows on each side of the Manuals, according to their number and the size of the Organ. The Draw-Stops of the Organ in Cologne Cathedral are arranged in four *horizontal* rows; and so are those of many other Continental Organs. At Westminster Abbey, the Draw-Stops are also placed in this manner. Regarding the best method of distinguishing such Draw-Stops as belong to one department from the remainder, this matter must necessarily depend in some measure on individual circumstances.

1133. In small Organs of two Manuals, the Great and Swell-Stops are generally arranged so as to form each a separate row; one on the right, the other on the left. An ivory plate inserted above each row, bearing the name of the Clavier to

which that tier belongs, is in that case all that is required to mark the requisite distinction. This plan of identifying the Draw-Stops with the Clavier to which they belong is far preferable to that of crowding such announcement on every individual Stop-handle, in addition to the name. The less there is engraved on the knob besides the name and length of the Stop, the better. What *is* engraved not only then appears more distinct, but there is then room to cut it in a bolder and more legible type.

1134. If the Draw-Stops are intended to be placed in double rows, it will be found a convenient arrangement to let the Swell-Stops comprise one portion of the two tiers on the left-hand side, and those of the Choir the remainder. The list of contents of each department is then brought within much more convenient range of the eye than when extended over a long tier of Draw-Stops. In that case, the Swell-Stops should occupy the upper position, and the Choir the lower. This arrangement also presents an analogy with the situation of the respective Manuals.

1135. When the Draw-Stops are numerous, they are frequently arranged in triple instead of double rows. This plan is a good one, as it prevents the tiers becoming inordinately long, and, therefore, keeps the upper Draw-Stops more within reach. The best method of then classifying the Stops is to make those belonging to one department occupy the upper portion of the three rows, and those of another, the lower. A little extra space, if possible, left where those of one Clavier leave off, and those of another begin, in addition to the engraved plate, will be found most advantageous in making the point of separation more distinct.

1136. Other means are sometimes taken in addition to those already mentioned for distinguishing the Draw-Stops of each department. Thus, in addition to their being arranged in tiers or in clusters, the ivory plates in the face of the Stop-handles of some of the departments are sometimes stained red, blue, green, or some other colour. If colours be used, for which there is no absolute occasion, they should be of the lightest possible tint, or they will render the inscriptions indistinct. Different substances are also occasionally used for the name-plates, for increasing the distinction; as ivory for those of one department, mother-o'-pearl for a second, porcelain for a third, tortois-shell for a fourth; and so on. These, however, give to the general appearance of the Draw-Stops a motley effect; as the colours, if deep, give them a heavy and patchey appearance. The best plan is to have the names of one department on each side printed in black, and the other in red. This has a very light and handsome effect, particularly when the character chosen is the old church text. The red-lettered labels should be above, and the black below. Every Stop should have its name engraved on the handle, in preference to being placed over or at the side of it; as this prevents the possibility of the inscription being by mistake read as referring to any other than the right Draw-Stop. The names are sometimes engraved on plates of zinc or brass, and inlaid; but those metals soon become tarnished. Many Organs have the names of the Stops printed on pieces of paper, which are pasted on, near to the handles; but such labels are apt to become soiled or rubbed off, and at the best present but a mean appearance.

1137. The head of each Stop-handle is usually turned out, and a plate of ivory or some other bright material inserted, bearing the requisite inscription.

1138. The inscriptions should be engraved boldly and legibly. For this reason,

italics, with long flourishing tails to the g's, &c. should be avoided, as not being so easily deciphered. Capital letters are the most appropriate; and those of the Egyptian, German, old English, or modern English character are available according to taste. Old English text for the names has a handsome appearance, and is particularly appropriate for Church Organs. It is better to have the names engraved in horizontal lines rather than in a circle, following the outline of the plate. It is then deciphered more easily and more quickly.

1139. In connection with the question of distinctness of labelling, it may not be out of place to mention, that the person who plans the Organ, will most probably have also to decide on the nomenclature for the Stops. When settling this by no means unimportant matter, it will be well to bear in mind the purpose for which the labelling is introduced at all; namely, to *assist* and *guide* the player. To carry out this object, the labels should describe in a simple and as clear a manner as possible the Stops to which they apply. And to facilitate this end, names in English would appear to be clearly the best for English Organs, whenever they are applicable. Sometimes, however, it is preferred to call the Stops after some Continental fashion. When this is done, care should be taken to apply the names, so that an Organist or Organ-builder from the country whence the terms are derived shall understand them. This necessary precaution has not always been attended to.

1140. It is of importance that the Draw-Stops should move with freedom, and noiselessly. A stiff and stunted Draw-Stop action is most disagreeable. If, however, the Table of the Sound-board is covered with leather,—i. e. if the Sliders work upon leather,—they will move rather stiffly at first, until the leather has become tolerably smooth, for which stiffness some allowance should be made.

1141. From $2\frac{1}{2}$ to 3 inches is a good distance for the Draw-Stops to move backwards and forwards.

1142. The Draw-Stops, which are better for being of a good medium size, should not be placed too closely together. If the knobs are $1\frac{1}{2}$ inch in diameter, with ivory plates $1\frac{1}{8}$ inch wide, and have the inscriptions cut in letters $\frac{1}{16}$ of an inch high, they will have a bold and handsome appearance.

CHAPTER XXXVII.

THE INTERIOR ARRANGEMENTS OF THE ORGAN.

The building-frame.

1143. THE building-frame that is to support the entire Organ should be very strong and substantial, and should be so constructed as to resist the great weight and pressure of the sound-boards and Pipes without sinking or giving in any manner.

The platform.

1144. It is not a less important and necessary precaution to see that the platform—when the Organ is to stand on one—is not only fully capable of supporting the entire weight of the instrument, but also that of any assembly that may be gathered around it from time to time;—as the members of an orchestra and chorus in a concert-room, or the choir and children in the gallery of a Church. Instances are known where this preventive course has not been sufficiently taken in music halls; the consequence being that, while the Organ is entirely free from cipherings and stickings at all other times, during concerts it is subject to both.

1145. With regard to the general arrangement of the interior of an Organ, the sound-boards and other main portions of the work would be distributed chiefly according to local circumstances.

The distribution of the sound-boards.

1146. The most usual positions assigned to the different sound-boards in English Organs were mentioned on page 1, and need not therefore be again described here.

1147. In some German Organs, occupying a very broad, high and shallow site, the "8-feet Great Organ" (*Haupt-manual*) is placed in the centre, with the "4-feet Choir" above (*Ober-manual*), and the "16-feet Pedal" half on each side; the largest Pipes of the "Principal" of each department, 8, 4, and 16 feet, being placed in the front of the case.

1148. In the Organ at St. Peter's Church, Cornhill, built by Hill, the large Swell is placed over the Great Organ, resembling in this respect the arrangement just mentioned; and when a church is very lofty, or an Organ is to stand at a great elevation above the ground, the Swell may be placed in this manner, without producing any disadvantageous effect; but rather the reverse, provided it be kept well up at the same time. The under side of the Swell sound-board then acts as a sort of reflector to the Great Organ, and directs its tone into the Church before it is too

much spent. The old English builders frequently put a top to their Cathedral Organs for the above-mentioned purpose: that to the instrument in St. Paul's remains to this day.

1149. In other German Organs, where the site is about the same width as before, but lower and deeper, the Choir Organ is placed in the centre, with the Great Organ, divided, flanking it on each side, and the Pedal behind. The object in placing the Great Organ partly on each side, rather than in the centre, no doubt, was to prevent its force being too sensibly felt at the keys. Other plans were sometimes adopted by the old English builders for shielding the Organist from the full strength of the instrument; such as keeping the impost of the case very high, or placing a passage-board completely across the front, between the Great Organ Sound-board and the front pipes, as was originally the case at St. Michael's, Cornhill. When there are three Manuals, the third Manual Organ is frequently placed "in front," as it is termed in England; but "at back," as they say in Germany, where that division is hence called *Ruckpositiv* (Back-choir). In very large instruments, the Pedal Organ frequently occupies three separate sites, forming what are called "side Pedal Basses," and "back Pedal Basses"—an English example of which arrangement will be found in Mr. Hill's Organ at the Panopticon; or, where the largest metal "Principals" appear in front of the case, a four-fold division of the Pedal will sometimes be met with, forming "front Pedal Basses," "back Pedal Basses," and "side Pedal Basses." Of this latter distribution, an English example occurs in the Town Hall Organ at Birmingham, by Hill.

1150. These particulars are given here, to show that an Organ may be made to suit almost any site, provided only that the necessary room be allowed in some direction or other.

The cause of the bad proportions of many English Organs.

1151. English Organs have frequently been found fault with, on account of their square, solid, inelegant form, and their projecting so far into the buildings wherein they stand. But this has in almost every case arisen from the builder being, in regard to room, so much restricted in the direction of width. In Churches which have west-end Organs, this has been more particularly the case; and for no better purpose than that of providing room for a mass of children up each side the instrument. In Continental Churches, where the whole width of the west-end is frequently devoted to the Organ, much larger instruments project to a far less distance into the buildings than do the smaller instruments in English Churches.

1152. It may be mentioned—as in some degree illustrating this point—that the performers in an orchestra are placed in comparatively a few long rows, from the correct supposition that such an arrangement has a more beneficial effect than if they were ranged in several shorter rows, behind one another, as though stationed on a wide staircase. For the same reason it will be conducive to the best musical result, if the Organ be made broad and shallow, rather than narrow and deep.

1153. In one or two instances the analogy between the interior arrangement of an Organ, and the distribution of an orchestra, has been carried to a still greater extent in German Organs; for sound-boards have occasionally been made to slope upwards from front to back, like a concert-room platform, upon which the Pipes

have been ranged in terrace-form, and with the largest Flue Stops at the back and the smallest in front. It was in the Organ at the Church of St. Maurice, at Halle, built by Schulze, that this last arrangement was for the first time practically brought to bear.

Much room conducive to the orderly arrangement of the Organ.

1154. But whatever general arrangements may be considered best to adapt an Organ to a particular site, it will be of essential service, in a variety of ways, to allot as much room to the instrument as can conveniently be spared.

1155. One of the first things which arrests the attention of a visitor, on entering a modern German Organ, whether of large or small dimensions, is the appearance of roominess which it presents; and this is speedily perceived to be accompanied by a very simple, yet orderly and systematic distribution of the several parts of which the Organ is composed.

The advantages of large Sound-boards.

1156. The roominess is soon discovered to arise, in a great measure, from the ample size of the Sound-boards, which, even in instruments of ordinary dimensions, frequently measure 9, 10, and 11 feet in length; and in large instruments, 15, 16, and even 17 feet from end to end. The orderly appearance of the Stops also is seen to result from the fact of the Sound-boards being sufficiently large to admit of their Pipes being placed "over their wind," whereby all *compulsory* recourse to the conveyancing off of Pipes is avoided.

1157. This plan—of planting all the Pipes on the Sound-board—might at first sight appear to involve a great "loss of room," as the phrase goes; but, on account of the admirable manner in which the Stops are sometimes planted, this is not the case to nearly the extent that might be imagined. The 8 and 4 feet members of the Flute-work are, in German Organs, as in English, frequently of Tenor C compass; and the way in which a Sound-board is sometimes laid out, so as to receive them, is as follows.

1158. The two Stops which form the basis of the Manual tone, corresponding to the English Open and Stopped Diapasons, of course extend to CC; and the twelve Pipes which form the 8 feet octave of each are ranged in a single row. The room which they require for their accommodation therefore is in the direction of width rather than of depth. At Tenor C, where the Pipes are little more than half size, the two 8-feet members of the Flute-work commence, and occupy the standing and speaking room now at liberty. For the sake of illustration, these may be supposed to be a Tenor C Gamba and a Tenor C Dulciana. To give to these two members of the Flute-work the effect of a complete range, when either may be used singly, the Dulciana is grooved into the Stopped Diapason in the 8-feet octave; and the Gamba, which is usually of fuller tone than most English Stops of the same name, is grooved into the Open Diapason in the Bass octave. At about middle $d^1\sharp$, where the Pipes of the four Stops will have become reduced to half dimensions, the single row plantation is discontinued in favor of the double row zig-zag plan, described in a former chapter; and this arrangement is continued up to the top. In a similar way one or two additional 4 feet Flute-stops are also frequently worked in from the Tenor C groove upwards.

1159. From measurements taken of existing specimens, it was found that the average dimensions of a German Sound-board furnished with nine Stops, of which the following are the English equivalents—

1—Bourdon .....16 feet tone.	6—Principal ..... 4 feet
2—Open Diapason..... 8 feet	7—Twelfth ..... $2\frac{2}{3}$ feet
3—Gamba to Tenor c.... 8 feet	8—Fifteenth ..... 2 feet
4—Stopped Diapason.... 8 feet tone.	9—Full Mixture, V ranks. 2 feet
5—Dulciana to Tenor c .. 8 feet	

were 3 feet in breadth, from back to front, and 11 feet in length.

1160. If we may judge from their works, the old English builders attached as much importance to placing the Pipes of their Organs over their respective grooves as the Germans do in the present day; for we find this system carried out in even their smallest Organs; the front Pipes frequently offering the only exception to the rule. They also followed the same plan in their larger instruments, as far as practicable; hence it is no very unusual circumstance to find the original sound-boards by Smith and Harris, Byfield and Bridge, measuring 8, 9, and 10 feet in length. A Great Organ sound-board by the first-mentioned builder, furnished with the following ten Stops, viz.

1—Open Diapason,	6—Fifteenth,
2—Stopped Diapason,	7—Sesqui-altera, III ranks,
3—Principal,	8—Mixture, II ranks,
4—Flute,	9—Cornet,
5—Twelfth,	10—Trumpet,

measured 2 feet 10 inches in width, and 9 feet in length.

1161. The sound-board to the Great Organ department of the instrument in St. Paul's Cathedral is about 13 feet in length. At the Panopticon, where a large opening had to be left through the very centre of the instrument, Mr. Hill nevertheless contrived to introduce Great Organ sound-boards about 10 feet in entire length; while, for the Pedal Basses, occupying the side wings and back, he provided others which are patterns for spaciousness and efficiency.

1162. In some German Manual sound-boards of the size indicated above, the grooves measured in the Bass octave 1 inch in width; in the Tenor and Middle octaves, $\frac{3}{4}$ of an inch; and in the Treble octave and upper half octave, $\frac{1}{2}$ an inch. The pallet-holes were of one length *throughout*, namely, 11 inches; and the grooves measured $3\frac{1}{2}$ inches in depth. The continuation of the pallet-holes at an unreduced length, in the 4-feet octave, was for the purpose of feeding the extra 8-feet Stops that commenced there; and their further continuation in the Treble was to supply the large Mixture ranks, which there returned to an Open Diapason.

1163. It may be added, that, although the Mixture included a duplication of the Open Diapason, Principal, Twelfth, and Fifteenth in the Treble, there was not the slightest symptom of sympathy, robbing, or unsteadiness in the speech of the Pipes, when all the Stops were drawn.

"Unoccupied space" in an Organ, not "lost room."

1164. The difference between the sound-board measurements just quoted is not so great as many might have anticipated it to have been. This, however, is partly due to the Bass of the German scales being smaller than the English, concerning which more is said further on. But had it been otherwise, it can never be correctly said that "unoccupied space" in an Organ, within reason, is "lost room;" since, next to the Pipes themselves, which are of course necessary to emit the primary sounds, free air is the most important element in the production of a buoyant and sweet quality of tone. It is, indeed, true that English Organ-builders have frequently been called upon to "get in" a great number of Stops into an unreasonably small space; and one cannot help admiring the manner in which they have frequently grappled with the difficulties which have beset them: at the same time, England is in consequence by no means destitute of Organs that are nearly as crowded, and almost as destitute of resonance, as a broker's shop. It is a fact always worth the remembrance of those who would limit an Organ-builder too strictly in regard to space, that one of the secrets of the good effect of many old instruments is their *comparative emptiness*. They have not only Pipes to produce tone, but breathing room to improve it.

The Abbe Vogler's Symplification system.

1165. Some notice should here be taken of Abbe Vogler's "symplification system;" of which Seidel has given a brief account in his work on Organ-building. (See Ewer's English edition, page 26.) "At the end of the eighteenth and the beginning of the nineteenth centuries," says Seidel, "George Joseph Vogler, the famous musician, composer, and Organ-player (born 1749, in Wurzburg—died 1814), tried to reform thoroughly the whole former mode of Organ-building, an experiment in which he succeeded to a great degree. His system, aiming at a *symplification of the whole mechanism* of the Organ, created great sensation at the time, and found as many admirers as opponents. All that was superfluous, inappropriate, or too costly, he endeavoured to do away with. First of all, he rendered the action simpler by arranging the keys (grooves) in their natural succession; in consequence of which, the construction of the roller-board (key movement) became easier and simpler, and the touch lighter. Vogler's system was adopted in several places, and even now some Organ-builders make use of it." Among other Continental builders who construct their Organs on Abbe Vogler's system, may be mentioned Schulze, of Paulinzelle, near Erfurt, who placed an instrument, so made, in the Great Exhibition of 1851; which Organ was afterwards purchased by Charles McKorkel, Esq. of Northampton, and erected in the Exchange Room of that town: while, in England, the same plan has for some years past been adopted by Kirtland and Jardine, of Manchester. Some disadvantages, as well as advantages, attend the semitonal arrangement; though, according to the account given to the writer by those builders in Germany and England who have had experience in making sound-boards on this principle—and of whose reports use is here freely made—the former are far outweighed by the latter.

1166. In Vogler's system, the grooves are arranged in their natural or semitonal succession throughout the sound-board; that is to say, the CC groove is placed

to the extreme left, and the f^3 in alt groove to the extreme right. The Pipes of all the Stops are arranged in the same order; so that in the Open Diapason, for instance, the CC or 8-feet Pipe is placed to the left of the Claviers, and the 4-inch f^3 in alt Pipe to their right; the intermediate Pipes forming a graduated series. The end of the sound-board to the right is therefore left clear of all but small Pipes.

1167. Among the disadvantages attendant on this system of groove arrangement, are mentioned the facts of the chief weight of the Pipe-work being thrown to one end of the sound-board and building frame; an increased consumption of wind taking place at that same end of the sound-board; longer conveyances being required to the front Pipes to the right, or a special little sound-board for them, or "mute" Pipes instead of speaking Pipes. The additional weight, and greater consumption of wind at one end, however, having each their ascertained limits, are provided against by a stronger building frame and larger wind-trunks; while a diminutive sound-board rids the Organ of long conveyances.

1168. The advantages attendant on the semitonal system of groove arrangement are stated to be as follow. The Pipes, being chiefly or entirely planted on their own wind, speak more promptly and plumply, and with a firmer tone than if grooved or conveyanced. But few Pipes, if any, being removed from over their grooves, few, if any, conveyances are required; hence a fertile source of loss of wind, hissings of escaping air, impediments to the wind from lodgment of chips, accidental damage of conveyances, and occasional repairs, are removed. The Pipes, when planted consecutively, have better speaking room.

1169. *Below* the sound-board, the action being in a direct line from the key to the pallet, no rollers are required; and there being no rollers, there are fewer centres, and consequently less friction. The direct-action thus secures a lighter touch, and more instantaneous response to the finger. The omission of the roller-boards clears the interior of the Organ of those walls of mechanism which not only impede the view of the instrument from front to back, but also prevent light penetrating to its remote parts. The tone, moreover, has then more room to *spread*, and is not thrown back, as must be the case to some extent when two or three roller-boards are in the Organ. Roller-boards being dispensed with, the remaining mechanism can be constructed or "set out" more compactly. There is also less liability to stickings in a radiating tracker movement, and less chance of its getting out of order; or, if out of order, it is easier and sooner repaired. The movement, by reason of its greater simplicity, is less affected by changes of temperature; and on account of its whole extent, from the key to the pallet, being under the eye, an Organist can at once detect and remedy any trifling disarrangement that might arise. An Organ built on Vogler's principle is more convenient to tune than one built in any other manner; and a larger Organ can be built on the simplification system, without the *necessity* for the Pneumatic Lever Action, than on the ordinary system. The larger and more ample sound-board will not increase the cost of the entire work, on account of the omission of the roller-board and numerous conveyances effecting a saving in the expense.

1170. Without waiting to discuss the validity of all the claims that are made in favor of the semitonal arrangement, or whether they are such as are likely to lead to the system in question superseding others, a few words may yet be said con-

cerning certain situations in Churches, in the construction of Organs for which the semitonal groove arrangement seems to be peculiarly suitable. But first it is necessary to notice the climax to the simplification system that was effected by Mr. Hill, although not actually applied by him to an instrument made on that principle. This consisted in making the chief portions of the building-frame *hollow*, so that they might serve as wind-trunks as well as supports to the instrument; by which means some of the most bulky cumbrances left remaining in the Abbe's system were easily and advantageously dispensed with, and in an ingenious manner that appears never to have occurred to the worthy Abbe. It was in Mr. Hill's Organ that stood in the Exhibition building of 1851 that this clever device was for the first time tried, and successfully.

1171. The semitonal system of groove arrangement seems to be well adapted for an Organ that is to occupy some side or corner position; from either of which points the sound would have to travel in *two* directions. Suppose, for example, an Organ so made to be placed on the south side of a Church, or in an Organ Chapel on that same side, with its back towards the south wall; the back of the case would reflect the tone forward, i. e. through and over the front, in the usual way, and therefore *across* the Church; while the left side of the case would reflect it to the right, and therefore *down* the Church. The small Pipes to the right would present no impediment to the sound of the large ones passing over them into the Church; while the side of the case, to the right, facing the Church, by being filled with perforated paneling, or with Pipes, would facilitate the egress of the tone in that direction, at the same time that it would form an additional adornment to the instrument itself. Or, supposing an Organ so constructed to be stationed at the east end of the north aisle, or in a north Chapel, with its keys towards the west, the sound would travel through the front, down the aisle, in the usual way, and through the right side, across the Chancel and Church.

1172. For a divided west-end Organ, also, the semitonal groove arrangement appears to be very suitable.

Passage-boards advantageous in more ways than one.

1173. It is very advisable that an Organ should be well furnished with wide passage-boards. These will enable one to move about the instrument, either for purposes of tuning or for examination, without unintentionally disturbing any of the Pipes, or of injuring the mechanism. Moreover, they are indirectly of beneficial service to the tone of the Organ, by being instrumental in securing a free current of air round the various masses of Pipes on the sound-boards.

The Pipes should be so arranged that the small ones are accessible.

1174. The Pipes should be so arranged on the sound-boards that they may all be easy of access for the purpose of cleaning, tuning, and regulating. If large and small Pipes be planted together in such a manner that the former present a barrier in the way of the tuner reaching the latter, a frequent and "unnecessary touching or taking out of the Pipes" will have to be resorted to, which, as Seidel truly observes, is injurious; as Pipes are soon bruised or bent. "Besides," he

continues, "if a Pipe, after having been taken out, is not replaced exactly in its former position, it will sound too flat or too high, too strong or too weak."

1175. With regard to the construction of the sound-boards, nearly all that was necessary has been said in a former chapter. The leathering of the table, which is so much dwelt upon in many foreign works on Organ-building, is almost universally considered by English Organ-builders to be superfluous, if the table, sliders, and upper boards are accurately adjusted to one another.

Double grooves in the Bass of large sound-boards advisable.

1176. If there are many Stops on a Manual to be supplied, it is better to have two distinct grooves to each key in the Bass octave, than one larger groove and one great pallet; and for this reason,—the large Pipes rapidly exhaust the wind from the groove, diminishing the pressure or density of the air therein; therefore, when drawn, they have the effect of flattening the pitch of the Mixtures, destroying their brightness, and of making the Reeds speak slow. By introducing two grooves, the Unison and Double Diapasons, and Principal, can be placed on one groove, and the Twelfth, Fifteenth, Mixtures and Reeds, on the other. The rollers would then, of course, be provided with two pallet-arms instead of one only; or, if squares were used, their second arm should be furnished with a small cross-bar, to each end of which a pull-down would be attached. John England, who first introduced double grooves into English Organs, used to perforate the sound-board bar that separated the two, for what reason does not clearly appear; but, in effect, this frequently allowed one groove to borrow from the other, and so to some extent permitted the reappearance of the defect the double grooves were designed to remove.

The roller-boards.

1177. The rollers should be so disposed that the tapped wires, buttons, hooks, &c. that communicate with them can be easily got at for purposes of regulation, renewal, &c. when occasion may require. Wooden arms are more silent in their action than iron, for which reason they are to be preferred; and some builders also bush the studs which support the rollers, i. e. line their perforations with cloth, or make the centre-pins work in leather buttons, to quiet the noise consequent on their motion.

The Bellows.

1178. The Bellows should be made of such dimensions that they will easily yield, and continue to give an abundant supply of wind, when all the Manuals are coupled together, with every Stop drawn, and the fullest chords are played on the Manuals and Pedal. The first thing Sebastian Bach used to do, when requested to examine an Organ, was to draw out all the Stops, and play on the full Organ. He used to say, he must first know whether the instrument had good lungs. (Forkel's Life of Bach.) A copious supply of wind is more particularly necessary, in the first instance, if the Organ is intended to receive subsequent additions. There should be no unsteadiness perceivable in the tone of the Organ at the moment when the feeders commence and complete their work; neither ought any clacking to be heard when the valves fall over the suckers in the feeders and the bottom-board; nor should there be any sucking or gasping noise heard when the feeders are being replenished; but which will be the case if the

suckers are too few or too small. The feeders and blowing-action should also work with but little noise. Many Organs have the Pedal as well as the Manual Organs supplied from the same bellows. When this is the case, the tone of the Manual Organs should remain perfectly firm and unaffected when any disjunct or staccato passage is being played on the Pedals.

1179. The reservoir of the bellows should of course have inverted ribs, counterbalances, and a waste pallet, which latter will cause the least noise if it be made to discharge the superfluous air into the feeders. The shape of the bellows is a matter of no importance: their proportions must necessarily be influenced in a great measure by local circumstances.

1180. As regards the situation for the bellows, the lower part of the Organ near to the ground is the place usually assigned to them in modern English instruments. In German Organs, they are more frequently put outside the case; as they were indeed in many old English instruments. Where the necessary additional room can be spared, the latter arrangement is the most advantageous, as it allows so much more space for the convenient distribution of the mechanism, as well as admitting of more ready means of access to its several parts for purposes of regulation, repair, &c.; besides which, the free space then left is beneficial to the resonance of the Organ. At Westminster Abbey, the bellows are in two chambers, under the Organ, in the Choir screen; at St. Paul's Cathedral, they are in a room behind the visitors' closets on the "Cantoris" side of the choir; at St. Martin's in the Fields, and at St. Philip's, Waterloo-place, they are placed in the belfry behind the Organ.

1181. If the bellows are to produce different pressures of wind,—to do which they will require to be furnished with upper reservoirs,—much additional height will be required for bellows' room. Under these circumstances, and if they are to be placed under the sound-boards, the latter must be well elevated; or, what would be much better, the bellows might be kept out of the Organ altogether.

The Wind-trunks.

1182. The Wind-trunks should be large enough to convey an ample supply of wind to the Wind-chests; otherwise it will be of little use the bellows yielding a good supply. Concussion bellows should also be applied, if found necessary; but if the Wind-trunks are of ample size, and are not very long, such appliances will probably not be required. If not absolutely necessary, they are almost better omitted than introduced. The writer is acquainted with an instance of a Concussion bellows being attached to a new Organ, in obedience to one of the conditions of the contract; and its disturbing the wind, which, before its introduction, was perfectly steady. It is a question whether Concussion bellows are not occasionally made too large. When it is seen how small a bellows, in the shape of a Tremulant, will disturb the wind, it seems that one four or five times the size can scarcely be necessary to correct the far less accidental disturbance that would be likely to occur in a well-winded Organ.

The Swell-box.

1183. The Swell-box should not be less than 2 inches in thickness; and it would be the better for being $2\frac{1}{2}$, particularly if it be a large one. The edges of the shutters should be faced with leather, cloth, or felt, to make them bed closely and shut in the tone. Walker lines the interior of

his Swell-boxes with very stout brown paper, about $\frac{1}{8}$ of an inch thick, to further subdue the tone when the shutters are closed.

The scale for the Pipe-work.

1184. The general dimensions of an Organ, containing a given list of Stops, are influenced by no one thing more than by the scale adopted for the Bass Pipes. Or, to put the fact in another shape, no single circumstance affects the question as to the number of Stops which may be satisfactorily placed in a given space, more than the wide or narrow measure selected for the large Pipes. Continental Organs of moderate dimensions ordinarily contain from 4 to 6 Pedal Stops; while those of the first class frequently have from 15 to 18. (See all the Foreign Specifications, in the Appendix.) To any one who might be led to calculate the standing-room of such instruments by the amount of space necessary to accommodate a single English Stop of the scale to which many sets of "Pedal Pipes" have been made, it would seem that such Organs must occupy a site almost sufficient for a small Church. Such, however, is not the case. It was stated in the first Chapter of this Division, that, in Germany, most of the Pedal Stops are properly viewed as simply "Basses" to some of the Manual Stops. This being the case, their scales exhibit but a very slight advance on those of the Manuals; one Pipe only frequently being the extent of the difference. The 16-feet Open Basses of Continental Organs, moreover, are frequently made of wood, as in English. Of the three fine instruments by Silbermann, at Strasbourg, two contain "Principal Basses" of this material (See Foreign Specifications, Nos. 35 and 36); and of these Organs the latter has two Open Wood Pedal Stops of 16 feet. Yet the largest of these only measures 9 inches by 11. In some very large German Organs, having about 16 Stops on the Pedal, and including two 16-feet Open Wood Stops, independently of the Violone, the scale of one is sometimes advanced, and the Stop hence called "Major-Bass," i. e. *Great*-Bass; but even the CCC Pipe of this Stop seldom exceeds 10 inches in width by 12 in depth. In two instances only could the writer trace the existence of Stops of greater calibre in foreign Organs. The "Contra Violone" at Cologne Cathedral (Foreign Specifications, No. 25) measures 12 inches across the mouth; and a Stop approaching the scale of English Pedal Pipes occurs in the St. Eustache Organ at Paris. (Foreign Specifications, No. 13, B.)

1185. In English Organs, even of ordinary size, the CCC Pedal Pipe not unfrequently measures 18 inches in width and 20 inches in depth: some examples are as much as 2 feet in depth.

1186. Then, of the Continental scales of longer wooden Pipes,—in the Organ at St. Paul's, Frankfort (Foreign Specifications, No. 40), built by the famous Walker, of Ludwigsburg, which has two Pedal Stops of 32 feet, one measures 11 inches across the mouth; the other, $15\frac{3}{4}$ inches. The CCCC Wood Pipe in the Cathedral Organ at Bremen (Foreign Specifications, No. 64), and in St. Mary's Church, Wismar (Foreign Specifications, No. 73), both by Schulze, measure exactly 12 inches each across the mouth. Comparing these dimensions with the English scale given above, it is seen that the 16-feet Pedal Pipe, as it exists in many of our ordinary-sized Organs, exceeds in bulk the 32-feet Pipe of Cathedral and other first class instruments of the Continent.

1187. The vast disparity of breadth in proportion to length between English

and foreign Organ Pipes naturally suggests these three questions—(1) how have Pipes of such huge bulk come into use? (2) what may be their effect? and (3) is that effect such as will justify the appointment of so much space, not easily spared, to their accommodation?

1188. The first Open Wood Pedal Pipes made in England were those added by Avery to the Organ in Westminster Abbey. They were "Unisons;" and, from that circumstance being designed simply to reinforce the Manual Diapasons in the Bass, no doubt proved sufficient for that purpose. What may have been the scale of those Pipes, the writer has not been able to ascertain; but, subsequently, the measure for the GG Unison Pedal Pipe became, and for several years continued to be, ordinarily, 12 inches for the depth; that is to say, the 10⅔ feet Pipe was equal in bulk to the 16-feet Major Bass Pipe of Continental Organs. When Pedal Pipes came to be altered in pitch from Unisons to Doubles, a single set, of the scale and power before in use, was incapable of asserting its independence.

1189. As, in former days, the compass of the Manuals was extended downwards, as a primitive method of obtaining from it deeper tones, so the calibre of the "Pedal Pipes" was now augmented, gradually, from little to more, in the hope of obtaining from them the effect of a proper Pedal Bass, until they at length assumed the dimensions already quoted. The huge scale, therefore, originated from a correct feeling, namely, a consciousness of the necessity for a Pedal Bass, proportioned in power to the Manual departments of the Organ, but accompanied at the same time by a misconception as to the proper method of carrying that feeling into effect. A "Bass" to the entire Organ was attempted to be forced from a single rank of Pipes, and with astonishing success, had one only, and that of an unvarying kind, been required from the Pedal. The effect of such a Pedal Stop was certainly most powerful and commanding, but not *amalgamating*. It formed no suitable Bass to any one Stop in the Organ. As a Pedal continuation to the Manual Diapason, it was without the true, serious, calm, deliberate, and mixing characteristics of that Stop. It was also too powerful and predominating for the numerous softer effects in constant requisition in all Organs, and only appeared to be in proportion when used in conjunction with the loud Organ: but the employment of the Full Organ being the exception, rather than the rule, the heavy sound of the great Stop constituted, in the great majority of cases, a very unsuitable Bass. Then, with regard to standing room, the large scale Pedal Pipes in some cases occupied as much room as would have accommodated *three* 16-feet Pedal Stops made to a more strictly correct measure; and it must be obvious that a Pedal Organ possessing an Open Diapason, Stopped Diapason, and Trombone, would have formed a far more efficient and *tractable* Bass to an instrument.

1190. Experiments subsequently made, together with a closer acquaintance with the Continental principles of the art, conduced to make evident the nature and extent of the original misconception to which reference has already been made; and to bring into clear view the true means by which it was to be rectified and superceded. These included a reduction of the measure previously adopted for Pedal *Pipes*, and an increase in the number of independent Pedal *Stops*. Among the first to revise their Pedal Bass scales were Hill and Robson. Mr. Hill, who had built a greater number of large Organs than any other man in England, and had therefore

given the large Pedal Pipe scale the most extended trial, thought it not inconsistent with his high position and character as a true artist, to scrutinise his former work, and, a few years since, to materially modify the hitherto approved proportions for large wood Pipes. Added to this, he insisted on the importance of securing several Stops instead of one; an honorable course, which he has not ceased to follow steadfastly and consistently up to the present time.

1191. Reverting to the scales of Continental Stops before given, some of them will be viewed as being extremely small. The quantity of tone, however, produced from the largest of them is really most astonishing. Voiced on a heavier wind than the Manual Stops—a system not at first adopted in England with the Pedal Pipes, although a highly advantageous one—and being copiously winded, they speak with a promptness and fulness that is highly satisfactory. A very careful trial and comparison of the smaller scaled Open Wood Stops of Continental Organs with the huge scale Pedal Pipes of English instruments, however, leads to the firm impression that the most useful scale for musical purposes lies between the two. And that such a scale is equal to the production of the best effects, is exemplified in the excellent 32-feet Open Pipes of the Westminster Abbey Organ, made by Mr. Hill, the sound of which is sufficient to fill the Minster, yet does not overpower even a single voice, which is detected the moment it is added to that of the other Stops by the richness which it imparts; yet does not obtrude itself, but, on the contrary, blends in the happiest manner with the sound of the rest of the Organ. The scale of the 16-feet Pipe of this Stop is 10 inches by 11½, which is a slight advance on Silbermann's Strasburg scale already quoted; and of the 32-feet Pipe, 19 inches by 22 inches, which is a little in advance of the Frankfort scale. For a Unison Pedal Open, the German Major Bass scale already given, namely, 10 inches by 12 for the 16-feet Pipe, has been adopted by Robson, in his Organ in Trinity Church, Sloane Street, where, for a moderate sized Organ, it answers as well as could possibly be desired. At Westminster Abbey, where the Great Organ is extended down to CCC, to serve as a substitute for an independent Pedal, the 16-feet Pipe of the Pedal Open Diapason measures 13½ inches by 16 inches. This, although far below the old Pedal Pipe measure, yet forms an admirable and ample "Major Bass" scale to the rest of the Organ.

1192. Then, with regard to large metal Pipes, great variation has likewise at different periods been made in their scale, also, in English instruments. The Organ in St. Paul's Cathedral has two Open Diapasons, part of the original work of Father Smith, on the Great Manual. These have long enjoyed a high reputation for the fulness, richness, and equality of their tone. The article in the *Musical Gazette*, so often quoted, says of them, "they have always been esteemed the finest Schmidt ever made; and are regular and uniform in the quality of tone throughout." The largest of the two 8-feet or CC Pipes of those Stops measures somewhat less than 6 inches in diameter; the corresponding Pipe in the Temple Organ, by the same maker, is 5⅓ inches across. The original FFF Pipe at the Temple was 7 inches in diameter; and the largest of the two original CCC or 16-feet Pipes, at St. Paul's, is a little under 10 inches across. Towards the latter end of the last century, Green effected a considerable increase on the measurement above given. This was before the introduction of Pedal Pipes (which either originated with Avery, or about his

time); and no doubt was intended by Green to impart additional weight to the Bass of his Organs. The CC Pipe he increased in diameter from 6 to 8 inches; his GG to 11, and his FFF from 7 inches to 12; that is, to 2 inches beyond Smith's scale for the 16-feet Pipe. Avery and England, who succeeded Green, availing themselves of the advantage which a set of small Pedal Pipes presented, reduced the scale again for the Bass of the Metal Diapasons.

1193. In Specifications for modern Organs, even those for small Churches, it is sometimes stipulated that the CC Metal Pipe shall measure 8 inches in diameter; or, in other words, shall be wider than Smith's large Cathedral scale for the FFF Pipe. As a matter that materially affects the question of room, it is worthy consideration whether the advantages of so greatly an enlarged scale are commensurate with the increased quantity of space required to accommodate Pipes of such a measure. Metal Pipes of so great a scale no doubt produce a somewhat heavier, thick, and more ponderous tone than others of less bulk; but not so close, firm, and *clean* a sound. There is always sufficient difficulty in obtaining an even tone from a Stop that increases in scale gradually from the lowest Pipe up to the top one. It was, in fact, this difficulty which led Muller of Amsterdam, and Batz of Utrecht, to apply duplicate Pipes to the Trebles of their Organs; and Cavaillé to adopt a heavier wind in the upper part of the Manual Compass, to overcome it. But if the scale be enlarged from the Tenor *downwards* also, and a more powerful tone *really* be produced in that direction, it seems clear that the tendency to an inequality in the general effect must be increased. It is well known that, for richness, fulness, and power, the Bass of Smith's Diapasons have never been surpassed. If they ever failed, as they occasionally did, it was in the upper part. Moreover, it is by no means a matter of course that an enlargement of scale will result in the production of a tone of an improved quality, as the following extract will show. The *Christian Remembrancer* for October, 1833, page 624, speaking of the Temple Organ, says, "it is somewhat remarkable that Schmidt should be able to produce so ponderous a tone in the lower notes of the Open Diapason, out of so small a scale Pipe; the FFF measuring only seven inches in diameter, whereas the same Pipe in Green's Organ at Greenwich Hospital measures twelve inches, and does not give so fine a note." The fact is, when the scale is increased, the Pipes then no longer remain members of the "Principal-work," but, from that enlargement, merge into the Flute-work (see *ante*, page 109, sec. 500; also Block-flute, page 119); and at the same time also cease to retain that clear and pure character of tone which is so closely associated with the idea of a true Diapason, and which then is exchanged for a heavier and less silvery tone. This refers to the large Pipes. As the "Diapason-measure" is exceeded, higher up in the musical scale, the Cornet-scale and tone is approached. For instance, if a Pedal Principal were to be made to a much-increased measure, so that its middle c^1 Pipe (2 feet) were to be advanced from about 2 inches to nearly $2\frac{1}{2}$ inches in diameter, it would produce a tone, powerful and broad, indeed, but utterly unlike that of a member of the Diapason-work.

1194. It has already been mentioned that the largest of the two 16-feet Pipes at St. Paul's Cathedral does not measure quite 10 inches in diameter; neither do those made by Cavaillé, in his magnificent new Organs at the Madelaine and St. Vincent de Paul, at Paris. And of upwards of twenty examples in German Organs

which the writer measured, not one exceeded 10 inches across; while the smallest was $9\frac{1}{2}$ inches only. The corresponding Pipe in modern English work has occasionally been made as much as 14 inches across; that is, within an inch of the 32-feet Pipe at Haarlem, which measures but 15 inches over. There seems, however, to be no essential advantage arising from the use of such large scales; while the waste of room which they involve is very great.

1195. The subject of the scale of large Open Wood and Metal Pipes has been entered into thus fully, because those who have to decide on the comparative merits of different Specifications are sometimes apt to attach undue value to those which promise "good bumping scales," and think lightly of others which do not;—to consider the necessity for great scaled Pipes as an unquestionable fact, and their advantages as being beyond doubt.

1196. Stopped Wood Pipes present a no less variation in regard to scale than do those of the Open kind. The ordinary English measure for the CCC Bourdon or Double Stopped Diapason Pipe, 16-feet tone, is $7\frac{1}{4}$ inches in width, by 9 inches in depth. Occasionally this scale has been increased to 12 inches in depth; but it has seldom been much lessened in England. The Swiss scale for Stopped Pipes is somewhat larger than the first of the above-mentioned English measures; i. e. it is about $9\frac{1}{2}$ inches by 11 for the CCC Pipe. This scale was adopted for the Pedal Stopped Bass of the Temple Organ, added by Robson, and is remarkably effective. In some modern German Organs, the scale of the large Stopped Pipes has been much reduced, and that without involving any loss of tone, so that a great saving of room has been effected. The unreduced quantity of tone from the narrower Pipe is secured by allowing a more copious supply of wind to enter the foot, instead of shutting part of it off by plugging; and by cutting the mouth higher. In this way a firmer, plumper, and purer tone is obtained from a CCC Pipe, measuring $6\frac{1}{8}$ inches by $4\frac{5}{8}$, than is to be heard from some English Pipes that are a foot deep. A Bourdon of the above scale occurs on the Great Manual of the German Organ in the Exchange Room at Northampton, and produces a remarkably full tone. The smaller scaled Pipes present the additional advantage of being more easily planted over their own wind on the Sound-board. It should be mentioned that the Pipes of a Stop made to the German scale just referred to, decrease in size or bulk more gradually than is common with English scales: that is to say, the scale is not reduced to half measure until it has reached the Pipe that sounds the interval of an *eleventh* from the Pipe whence the calculation commences. The following therefore presents an outline of the scale in question.

GREAT MANUAL BOURDON SCALE.

Pipe.	Depth.	Width.	Diameter of Foot-hole.
CCC	$6\frac{1}{8}$ inches	$4\frac{5}{8}$ inches	$1\frac{5}{8}$ inch.
GG	$4\frac{3}{4}$ inches	$3\frac{1}{4}$ inches	$1\frac{1}{2}$ inch.
CC	$3\frac{5}{8}$ inches	$2\frac{13}{16}$ inches	$1\frac{5}{16}$ inch.
FF	$3\frac{1}{16}$ inches	$2\frac{5}{16}$ inches	$1\frac{1}{8}$ inch.
Tenor c ...	$2\frac{3}{16}$ inches	$1\frac{11}{16}$ inches	$\frac{15}{16}$ inch.
Middle b flat	$1\frac{1}{2}$ inches	$1\frac{9}{16}$ inches	$\frac{7}{8}$ inch.

1197. The height of mouth, for a 3-inch wind, is, on the average, about equal to half the width.

1198. Another class of covered Stops, producing a delicate tone, and called, in Germany, Lieblich Gedackt (Lovely-toned Stopped Diapasons), is made to a smaller scale again than the Bourdon. It occurs in many foreign instruments; and is also frequently introduced by Schulze to form the Unison and Double Stopped Diapasons of his Choir or Swell Organs. Its scale decreases in the same ratio as that of the Bourdon already noticed.

LIEBLICH GEDACKT SCALE, FOR CHOIR OR SWELL COVERED STOPS.

Pipe.	Depth.	Width	Diameter of Foot-hole.
CCC	5 inches	$3\frac{3}{8}$ inches	$\frac{15}{16}$ of an inch.
GG	$3\frac{3}{4}$ inches	$2\frac{11}{16}$ inches	$\frac{13}{16}$ of an inch.
CC	3 inches	$2\frac{3}{16}$ inches	$\frac{3}{4}$ of an inch.
FF	$2\frac{1}{2}$ inches	$1\frac{11}{16}$ inch	$\frac{11}{16}$ of an inch.
Tenor c	$1\frac{7}{8}$ inch	$1\frac{3}{8}$ inch	$\frac{9}{16}$ of an inch.
Middle b flat	$1\frac{1}{4}$ inch	$1\frac{3}{16}$ of an inch	$\frac{3}{8}$ of an inch.

1199. The peculiar value of the Lieblich Gedackt scale for the Swell Covered Stops consists more particularly in the comparatively small amount of standing and speaking room required for the accommodation of Pipes made to that measure. The CCC Pipe is scarcely any wider or deeper than the CC Pipe of some English scales; that is to say, the lowest Pipe of a Double Stopped Diapason made to the Lieblich Gedackt scale does not call for more standing room than the lowest Pipe of some Unison Stopped Diapasons made to the English scale. It consequently admits of the entire Stop being placed inside the Swell-box, whereby its whole range derives the advantage and benefit of the crescendo and diminuendo; whereas, on account of the size of the Bass Pipes of a Bourdon made to the usual English scale, the lowest octave of the Stop has generally to be placed outside the box, even in the largest Swells. Examples of Lieblich Gedackts, as Choir Organ Stops, of 16 and 8 feet tone, occur on the upper Manual of the Organ at the Exchange, Northampton.

1200. It will now be seen why a German Organ should not cover the great space that might at first have been imagined. The lowest Open, Stopped, and Pedal Pipes of an ordinary GG Organ frequently equal in bulk the 16-feet Pipes of a German Organ.

1201. There is one thing in connection with the question of large and small scales that is well worth mentioning in this place. It does not answer to plant large scale Bourdons semitonally. This fact was proved by an Organ-builder in the following manner. The CCC Pipe was put in its place, voiced and tuned; then the CCC♯ was completed in a similar manner, when it was found that the CCC Pipe had become uncertain and windy in its speech. The DDD was next added, and having in its turn been tuned and voiced, the CCC♯ was tried, and that was found to be spoiled by the DDD, as the CCC had been by the CCC♯. Four more Pipes, up to FFF♯, were added, one by one, and every successive Pipe destroyed the speech of the one below it. There was not a single exception; the only good sound

was from the FFF♯ Pipe, which completed the series. It was shown by this experiment, (1) that the speech of a Stopped Pipe is not affected by the note its *semitone below*, but by the *semitone above;* and (2) that the vibration at the mouth of a large scale Stopped Pipe has an influence upon the Pipe its semitone below, that does not appear in *small* scale Stopped Pipes; and it is argued from this, that the semitonal arrangement *and* the large scale English Stopped-work could not be satisfactorily combined. If this be true, it is curious that, in the system of semitonal arrangement, the scales should be required to be small, and for two very opposite reasons (at least, having no immediate relation); 1st, that they may be planted without loss of room; and 2nd, that an acoustical phenomenon or law requires them to be so, *if* planted semitonally; and of course it would be absurd to set out a sound-board semitonally to simplify the action, and then by conveyances, groove-boards, or such like means, to plant the Pipes otherwise.

The Materials for the Pipe-work.

1202. The different metals, woods, and compounds used in the construction of Organ Pipes were enumerated in a previous Chapter. In the Specification for which the Organ-builder's Estimate is afterwards to be obtained, it ought to be distinctly specified what materials are desired to be used in the formation of the Pipe-work; which Stops, if any, are to be made of pure Tin, which of Metal, and which of Wood: also, if some are designed to be made partly of Tin or Metal, and the remainder of Wood; on what note the Metal Pipes are to be discontinued and the Wood ones to commence; and lastly, the proportions of Tin and Lead to be employed in the composition of the Metal. One of the particulars on which the ultimate cost of an Organ rightly depends is the standard of the Metal that is to be used, and the gross weight of it to be embodied in the instrument; and an Organ-builder who proposes to employ Tin or the best Metal, in good quantity, must necessarily require a higher sum for his work than he would demand, were a less valuable Metal and a smaller quantity of it understood to be all that was desired. An Estimate, therefore, that would appear to be a high one, were not these circumstances to be taken into consideration, will often prove to be both just and reasonable when it is more closely examined. But English Organ-builders are by no means agreed on certain questions relating to Metal Pipes; some considering that "substance" in material is of more importance than quality, while others view quality as of more consequence than substance. Preparatory to offering any observations on these points, it may be observed that the bodies of Metal Pipes should *vibrate*, but not *tremble;* that is to say, they should vibrate from the natural elasticity of the metal or compound of which they are made, but not tremble from thinness of material or weakness of texture. Of the two materials which form the chief ingredients in Organ Pipe metal, Tin is light, firm, and elastic; and Lead, heavy, weak, and comparatively inelastic.

1203. Strictly speaking, it is the periodical motion of the column of air that is within a Pipe, rather than the Pipe which encloses it, that is the source of the tone. The substance and quality of the walls of the Pipe, however, have a great deal to do with the strength and character of the sound produced; and in this way, if the material of which a Pipe is made be thin in substance, it will be weaker, more pliant, and consequently less impatient to return to its state of repose. The Pipe

therefore will not bear much blowing, as, in that case, its sides would not be strong enough to resist or counterbalance the power of the wind; and would tremble, and produce a blurring sound. Being thus unable to resist any *violent* excitation of the column of air within, a thin Pipe can only be *slightly* blown, and hence will produce only a light tone. If thin material, however, be pure Tin, or good spotted metal, it will on that account be firmer; and the sharp and rapid vibration of a Pipe made from such sheets will cause the tone to be of a more refined and silvery quality.

1204. A Pipe made of thick metal will bear much more blowing, without its vibratory motion being exaggerated into a trembling; consequently it will be capable of producing a much fuller tone than a thin Pipe of the same scale. For instance, the stronger the Organ-wind, or the greater the quantity of it entering a Pipe through a larger foot-hole, the more powerfully will the column of air within the Pipe be excited, and consequently the greater will be its friction against the sides of the Pipe. If the strength and firmness of the Pipe have been correspondingly increased, it will successfully resist the influence of the stronger current; the whole resulting in the production of a clearer and better tone. If, added to its substance, the metal of the Pipe be compounded chiefly of Tin, this will cause it to be firmer still, and therefore more *resisting* at first; but if fully excited by the more copious blowing which it will bear, it will prove more elastic, and more impatient to return to its state of rest; and, from the great strength and power of its vibrations, will produce a sound remarkable for clearness as well as for a ringing character.

1205. It has been customary to attribute the distinction in the tone of the Organs of different builders to the voicing and winding of the Pipes, which is of course true to a great extent; but the substance and quality of the metal have been important primary agents in the matter. Father Smith used metal of fine quality and great substance, while Green employed good spotted metal, but of less thickness; and Smith could no more have obtained Green's light, playful, and musical tone from his thick Pipes, than could Green have produced Smith's powerful and ringing tone from his thin Pipes. Green was aware of this, particularly in regard to Bass Pipes—hence his great enlargement of the scale; but, from the thinness of their material, they would not bear much blowing—hence their inferiority in general effect, as already quoted.

1206. But, whatever difference of opinion may exist as to whether and to what extent the tone is influenced by the metal or compound used, there can be no doubt of the greater *durability* of Pipes formed of Tin, or chiefly so, over every other composition that has been commonly employed for the purpose. The metal used by Harris and Smith, for the chief part of the Pipe-work of their Organs, contained a great proportion of Tin among its ingredients; and the present condition of the original Pipes of many of the instruments constructed by those makers, fully confirms the correctness of the opinion as to the lasting character of Organ-pipes made, in the first instance, of metal of good quality and thick in substance. Harris's Organ, at St. Sepulchre's, was built in 1667; Smith's, at the Temple, in 1685; and that at St. Paul's Cathedral, by the last-mentioned builder, in 1695. The original Metal Pipes of these Organs are still so sound, after a lapse of 187, 169, and 159 years, respectively, that with care they will last another century at least. The com-

parative durability of metal compounds, of various kinds, was well illustrated in an Organ which passed not long since into the hands of an Organ-builder. The Organ had been made rather more than a century; and while the original Pipes, of spotted metal, were found to be quite sound, the feet of others of *subsequent* introduction, formed of inferior metal, had been so attacked by the strong acid in the wood of which the upper-boards were made, that the apex of the feet of several of them was completely eaten away.

1207. Other evidences of the great durability of substantial Pipes of Tin, or good Metal, are afforded by the great age of several continental Organs, the dates of the erection of which are authenticated. The Organ in the Cathedral at Constance, in Switzerland, was built in 1518; that in the Cathedral of Freiburg, in Breisgau, in 1520; that in the Cathedral at Antwerp, in 1645; and that in the Cathedral at Lucerne, in Switzerland, in the year 1651. The particulars of numerous other old Organs are contained in the Appendix; but, from the *approximate* age only having been ascertained, they cannot be quoted here.

1208. Moreover, the writer put the question distinctly to a German Organ-builder, how long he considered an Organ ought to last; and he gave it as his deliberate opinion that, if well constructed, out of the best and most substantial materials, and taken the best care of, it ought to continue good for four hundred years. An Organ lasting for so protracted a period will no doubt appear strange to many; but the undoubted age of numerous continental instruments, together with the good state of preservation the Pipes of many of them are in, fully justify the above calculation; while the fact of certain of the Stops of old Organs being in some cases retained in their successors, as at Cologne and Liege, further supports it.

1209. That Pipe-work made of metal of good quality and substance retains its fulness, brilliance, and "ring," for a very lengthened period, is a fact fully borne out by the effect of numerous old English Organs. Age, however, is said to have materially assisted in imparting to the tone that peculiar richness, purity, and healthy clearness for which many old instruments are so remarkable; and which some builders hold were not so strikingly among the original attributes of those instruments. That these opinions are well founded, the writer can testify, from what he observed in Organs of different ages abroad. In *new* Organs that had Pipe-work of substantial metal composed of equal parts of Tin and Lead, and the Pipes of which were well blown, the tone was firm, massive, and clear, but generally with a slight tendency to a *piercing* character. In other Organs, a few years old, voiced by the same hand, the latter characteristic no longer remained, but was giving place to the peculiar mellowness that all detect in the "old tone."

1210. But if time effects so much for an Organ, how important must it be to secure the use of the most durable metal for its Pipe-work; otherwise, at the very period when the mellowing hand of time ought to be bringing the instrument to perfection, the Pipe-work will have seen its best days, and be becoming useless at the very time that it ought to be enhancing in value.

1211. While, in some instances, the scale has been increased for the large metal Pipes, it has been decreased for the small ones forming the "chorus." When the scale of the harmonic series of Stops is "kept up," and the Pipes are well blown, a tone is produced that is remarkable for fulness, breadth, and power. When, on the

contrary, their measure is reduced more rapidly, the small Stops are less full and more penetrating in tone. In some German Organs, both codes of scales are adopted; that is to say, a rather large scale is followed for the harmonic series of Stops, including the *first* Mixture, and a smaller for the second Compound Stop; the 2-feet Pipe (c^1) of the latter being usually of the same diameter as the e^1 or f^1 Pipe of the Diapason; i. e. of Geigen Principal scale. The second Stop is then sometimes called "Scharf," or "Cymbal," either of which names would suggest the idea of a ringing, sharp-toned Stop. The third Compound Stop is usually a Cornet, so that on many German Great Manuals will be found, first, a Mixture of nearly full Principal scale, a second rather below, and a third one above that measure.

1212. Wood Pipe-work is introduced to a greater proportionate extent in modern than it was in old Organs, as it effects a judicious saving in the expense. Many of the largest Pipes in the Pedal Organ are almost invariably made of this material; so also is a great portion of the Flute-work of recent invention or introduction into this country. The Stopped Diapason and Flute Stops on every Manual of modern Organs, too, are frequently made of wood; so are the Bass Pipes of the Open Diapason; while, in old instruments, the Treble of the former and the Bass of the latter were more commonly made of metal. When long wood Pipes are made to a small scale, they are capable of producing a very close imitation of the "metal tone," and in that case form a most efficient substitute for good metal Pipes, in the Bass, when the latter are not attainable. In some foreign Organs, a wood Bass of this kind is united to a metal Treble so successfully, that it is scarcely possible to trace on what notes the one material is discontinued and the other commenced.

The price of the Organ.

1213. We have now arrived at the last, but by no means the least important question for consideration; namely, the *price* of the Organ. This matter necessarily rests, to some extent, with the builder chosen, but remains to a much greater degree in the hands of the purchasers.

1214. From what has been explained in the preceding sections, it must be obvious that there is a durable, complete, but *costly* way of building an Organ; and an unsubstantial, incomplete, and *cheap* way of making it. It is also equally evident that Organ-building may be viewed as a calling of high art, or treated merely as a matter of business; and it will be exercised in either the former or the latter spirit, according to circumstances.

1215. Under the most extreme circumstances, the Organ-builder must *exist* by the exercise of his calling; but at the same time it is only consistent with the proper feeling of ambition that actuates every genuine artist, that he would prefer *also* rearing specimens of his art to which he might point with pride, as well as his successors for generations after him. But this second condition must obviously depend on the means placed at his disposal.

1216. On being applied to to make proposals for the construction and erection of an Organ, an Organ-builder may draw up a Specification for an instrument of given contents, and, intending to use certain materials, and to devote much attention to various matters of detail and finish which cannot be specified in an estimate without extending it to the length of a pamphlet, place his charge at, say, £1000. He may, however, have good reason to know that that figure will ensure him the *loss* of

the "order;" accordingly, without altering one of the written conditions of his contract, or foregoing one penny of his own fair profit, but simply by reducing the standard or substance, or both, of his metal, and paying less regard to the minute excellences of his work, he can, "to meet circumstances," at once lower his estimate from £1000 to £850. It is in this sense that "the price of the Organ" is said to remain so much in the hands of the purchasers. But when the Organ is completed, will it rank as highly, *as a work of art*, as it was originally intended by its designer it should do? Will it reflect more than *temporary* credit on its builder? A few years pass, and *the Organ itself* probably solves these problems. And as though to reduce its existence to the shortest span, the crowded Organ has perhaps been devoted to a site bounded by cold or damp walls, where the leather-work has quickly rotted, the brass-work corroded, the iron-work rusted, the glue soddened, and the accurate adjustment of the several parts of the wood-work, by swelling, been disturbed. Crooked or bruised metal Pipes, cracked wooden Pipes, running sound-boards, twisted rollers, double frictional resistance opposed to the fingers at the keys, and numerous other such fatalities, too frequently indicate what are and must ever be among the most probable distinctivenesses of the "cheap Organ." Nor is the builder exactly to be held responsible for all this, if he gave timely advice and warning.

1217. So far it has been shown by how easy a course the price of an Organ of a given size may be materially reduced, to accommodate the estimate to particular circumstances. But the process may be reversed; i. e. the size of an Organ may undergo great *apparent* increase, when "a grand Organ" is desired for the price of one of ordinary dimensions.

1218. An Organ with, say, fifty Stops will cost either about £1000 or nearly £2000, according to circumstances. If its Specification be drawn up in a spirit consistent with the magnitude of the work, as *implied* by the number of its Stops—if the Stops chosen are introduced mostly in a "complete" form, and if a just proportion be observed in the distribution of the Stops between the Manuals and Pedal—the cost of such an instrument will certainly approach the higher of the two rough estimates above given. But then it will also be a genuine specimen of the German system of Organ-building, carried out in its amplitude and integrity. Among the fundamental laws of that system are these: if a Great Manual be furnished with sixteen Stops, those should include at least two Double Stops, one of which must be a Double Open Diapason throughout. Or, to follow the German form of expression more closely, the Great Organ should be a "16-feet Manual." Then all the Manuals—by which is meant the *Organs* as well as the *Keys*—should be of equal, that is CC, range: and the Pedal moreover should, as a *minimum* proportion, have at least one-third as many Stops as the Great Manual.

1219. These and other governing rules of the science, however, can only be recognised, or at least followed, when "the price" will admit of their being so. But it too frequently happens that the approximate price for the Organ has already been fixed, and the hoped-for number of Stops also considered; in which case, all that is left for an Organ-builder to do, who desires to secure the order, is to prepare a design that will as little as possible run counter to these pre-formed expectations. He sees clearly that a plan for an instrument on the genuine German principle will

exclude itself by its appended estimate; that there is every probability of the prize falling into the hands of he who can prepare the most "promising" Specification; therefore ideas about "art" must subserve to those relating to "business."

1220. Nor can Organ-builders fairly be held accountable for adopting the obvious alternative thus imposed upon them, and which amounts to this in effect, if not in words: he who will prepare the Specification that seems to promise the most extensive instrument for the stated terms—who, in fact, can the most successfully make what would form a smaller Organ look like a larger, upon paper—will stand the best chance of securing "the order." And the ingenuity sometimes displayed in estimates drawn up to meet such expectations almost calls for admiration. First, instead of the Specification stating that the proposed instrument shall be built on the German *system*, which would be embodying a great deal; all it will promise, if it be prudently drawn up, is, that it shall be made to the German *compass*, which is at the same time the old English compass of two centuries ago, and implies but little. Next, several of the Stops are planned to draw in *halves;* every such divided Stop thus appearing as *two;* or they are introduced in an incomplete form, to meet other incomplete Stops*. In this manner a great step is made towards securing the necessary array of "Stops;" many persons judging of the excellence of an Organ by the number of its *handles*, rather than by the excellence and completeness of what those handles *govern*. The *Couplers*, even, to swell the number, are sometimes enumerated as "Stops." Then the important distinction between "standard size" and "size of tone" is overlooked; and the two portions of the Stopped Diapason, which together form in reality but one Stop of 8-feet *tone*, in consequence bear the aspect of two Stops of 8 *feet*. The Bourdon, also, if divided, appears as two Stops of 16 *feet*. In this manner the Stops in question, and by consequence the department to which they belong, are left open to a flattering estimate of their real dimensions†. The *one* Sesqui-altera of V ranks, again, which is to be found in all the most important Organs of Germany, as well as in those of Bridge, Byfield, Harris, and Snetzler, has to be made to draw as two or even three Stops. Then the Swell *Organ*—which is essentially of English invention and development—is more highly and justly appreciated in this country than in any other in Europe—is a department in the construction of which an Organ-builder takes peculiar pride and interest—this must be cut short at Tenor c; which denudation deprives the Swell of its finest octave, though to be sure at the same time it effects a saving of nearly £100 in the cost of that department alone, in the instance of a design for a large Swell, and

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* As a matter of fact, it should be mentioned that three of the modern Organs that are the most free from half and incomplete Stops, are those in the Church of St. Mary at Hill; St. Walburgh's Catholic Church, Preston; and at the Panoptieon; all by Hill. The former has but four such Stops among a series of thirty; the second, not one Stop of broken range among thirty Stops; and the latter, two only among sixty.

† It has already been explained (see page 245, sec. 1031) that it is not the *tone* of the deepest *sounding* Covered Stop, but the "standard length" of the largest Stop of the Open Diapason species, that fixes the size of a Manual or Pedal Organ. Among other instruments, of which the Great Organ department is a 16-feet Manual, in the strict sense of the term, must be classed those at the Panopticon, by Hill; and at Buxton Road and Highfield Chapels, Huddersfield, by Robson and Walker.

must therefore be resorted to as one means of keeping down the price of the instrument. The Swell *Manual* indeed perhaps runs "throughout," though that is of little value without its proper Pipes. Numerous small and inexpensive Stops, again, find admission, which assist in making up the required number at no great outlay; while many large and costly ones are necessarily excluded, to bring the instrument within the narrow bounds prescribed by the stipulated terms. In this manner the admirable rule which lies at the very foundation of the German *system* of Organ-building—that the Pedal shall have, at the least, one-third as many Stops as the Great Manual—and which is specially intended to check all excess in small or incomplete Stops, as well as the slighting of large and more important ones, is perforce treated as though it had no existence. By the above and other such means, a Specification for an Organ of almost any number of Stops—i. e. handles—may be provided, to suit almost any sum that may be named. But it cannot be supposed that any Organ-builder who has a real love for his art can *prefer* building an instrument according to so unhealthy a system, however readily he may *consent* to do so. Yet, despite the discouraging influences under which it has been sometimes carried on, Organ-building has nevertheless progressed marvellously within the last fifteen years, particularly in respect to those mechanical details which ensure quietness in the action generally, and which relate to lightness and promptness in the touch of large instruments, as well as in the selection and variety of the Stops; but in regard to the completeness of the compass of the Stops, and the excellence of the metal used in their conformation, great "progress" might still be made by *going back* to the customs of a century or more since. But these latter returns, whenever they may take place, must be *preceded* by a corresponding return to something akin to the fair and liberal terms paid to the artists of former times. What these might have been may be gathered from the following extracts, taken quite at random, from a list of many which were ready at hand. It is recorded that Father Smith had 1000 guineas for the Organ (about 20 Stops) at the Temple Church, and 500 more for the case; for the St. Paul's Cathedral Organ (about 28 Stops), £2000; and for that in Durham Cathedral (17 Stops), £700 and the old Organ. For the Westminster Abbey Organ (21 Stops), Schrider had £1000; and Green, for the Organ at Greenwich Hospital (26 Stops), £1000, exclusive of the case. Harris had for the St. Patrick's Cathedral Organ, Dublin (13 Stops), £505. Then, for a single Stop, Byfield received £50 for the Trumpet in the Cathedral Organ at Chichester. It is indeed true that most of the Stops in the Organs above mentioned were "whole" Stops, and not only so, but were even beyond the full necessary CC range: still, after making an ample reduction for the costly extra notes below, a sum remains that is far beyond what any English Organ-builder is accustomed to command in the present day for a similar amount of work. We need not wonder, then, at the completeness, so far as they went, goodness of material, excellence of finish, beauty of tone, and durability of old instruments made under such favorable auspices.

1221. For the Organ in the Church of St. Vincent de Paul (40 sounding Stops), at Paris, Cavaillé received £2000; and for that at the Madelaine (48 sounding Stops), £2500. The above matters relating to the price, excellence, and completeness of an Organ, have been entered into thus fully and unreservedly in this

place, first, because emanating as they do from one who is wholly unconnected with the Organ-building business, and who therefore can in no way be interested in the issue, beyond what is shared by all who admire excellence, irrespective of size, they may perhaps be permitted to exercise some influence with those who have to detect the actual merits of competing estimates; and secondly, because they really involve the permanent interest of the purchaser, the credit of the builder, and the progress of the art, in equal degrees. It need only be added, that a builder of high reputation will naturally expect, and will be entitled to receive, higher remuneration for his work than one of less eminence.

CHAPTER XXXVIII.

PLANS FOR ORGANS OF VARIOUS SIZES.

1222. SOME plans or Specifications for Organs of various sizes will now be given, which will illustrate the several rules that have been explained in detail in preceding Chapters of this book; and will also serve to show by what easy and successive steps an instrument is gradually developed from a small Chapel Organ into a large Cathedral Organ, without any of the primary laws of the science; as, for instance, that relating to the standard compass of the Manuals being overturned or modified in any way. In their preparation, the schemes of the best English and Foreign Organs, of old as well as of recent times, have been consulted, and their best features embodied, so far as has been found practicable, or seemed to be in accordance with the requirements of an English Organ. As, however, nearly every Organ-builder and Organist has his predilection in favour of certain Stops, and as each would consequently arrange them somewhat differently in a scale intended to display them in the order of their relative importance; many of the Stops suggested in the following Specifications, particularly the members of the Flute-work, would probably be required to be cancelled in favour of other Stops, to accommodate the Specifications to particular tastes.

I. SPECIFICATION FOR A SMALL ORGAN OF VIII SOUNDING STOPS, I MANUAL, AND PEDAL.

Manual, 7 Stops.

1—Open Diapason, the Bass octave of wood ..... 8 feet.
2—Stopped Diapason..... 8 feet tone.
3—Dulciana to Tenor c, grooved into Stopped Diapason below .... 8 feet.
4—Principal..... 4 feet.
5—Stopped Flute, to Tenor c ..... 4 feet tone.
6—Twelfth..... $2\frac{2}{3}$ feet.
7—Fifteenth ..... 2 feet.

Pedal, 1 Stop.

8—Stopped Bass.... 16 feet tone.

Accesssory Stops, Movements, &c.

1—Coupler, Manual to Pedal.
2, 3, 4—Three Composition Pedals.
Manual range, CC to g^3 in altissimo, 56 notes.
Pedal range, CCC to Tenor f, 30 notes.

1223. If more power than the above Stops are calculated to produce should be required, without increasing the number of the Stops, or adding much to the cost of the instrument, this might be obtained by altering the Specification after the following manner.

Second Specification for a small Organ of 8 sounding Stops, 1 Manual, and Pedal.

Manual, 7 Stops.

1—Open Diapason, the Bass octave of wood ..... 8 feet.
2—Clarabella Treble, with Stopped Bass ..... 8 feet.
3—Gamba to Tenor c, grooved into Open Diapason below .... 8 feet.
4—Principal ..... 4 feet.
5—Wald Flute, to Tenor c. 4 feet.
6—Fifteenth ..... 2 feet.
7—Full Mixture, II ranks. $1\frac{1}{3}$ foot.

Pedal, 1 Stop.

8—Stopped Bass .... 16 feet tone.

Accessory Stops, Movements, &c.

1—Coupler, Manual to Pedal.
2, 3. 4—Three Composition Pedals.
Manual range, CC to g^3 in altissimo, 56 notes.
Pedal range, CCC to Tenor f, 30 notes.

1224. The Clarabella and Gamba would augment the Unison tone, and the Wald Flute the octave pitch, while the little II rank Mixture, consisting of a 19th and 22nd in the Bass, and a 12th and 15th from Middle c^1 upwards, would brighten the Bass and add more clearness to the Treble. With regard to the custom of grooving one Stop into a second one in the Bass, it might be imagined that the "two winds" would cause the corresponding Pipes to "overblow." Where, however, the Pipes are in the first instance well blown, and the sound-board grooves are large enough to hold an ample supply of wind for all the Pipes fed therefrom, this is not the case; as may be illustrated at the Panopticon, where a key may be held down on, say the Swell, and then the corresponding key on the side Manual, acting on a *second* pallet, be lowered, without any difference being perceptible in the intonation of the Pipes. Neither does any such defect appear in the grooved Stops of the well-winded Organs of the Continent.

II. SPECIFICATION FOR AN ORGAN WITH XIII SOUNDING STOPS, II MANUALS, AND PEDAL.

Great Organ, 8 Stops.

1—Open Diapason ..... 8 feet.
2—Gamba or Dulciana to Tenor c..... 8 feet.
3—Stopped Diapason .... 8 feet tone.
4—Principal ..... 4 feet.
5—Stopped Flute ..... 4 feet tone.
6—Twelfth ..... $2\frac{2}{3}$ feet.
7—Fifteenth ..... 2 feet.
8—Mixture . . III ranks.

Swell Organ, 4 Stops.

9—Open Diapason..... 8 feet.	11—Principal..... 4 feet.
10—Stopped Diapason .... 8 feet tone.	12—Hautboy..... 8 feet.

Pedal Organ, 1 Stop.

13—Open Bass..... 16 feet.	Octave Bass, by means of coupler .. 8 feet.

Accessory Stops, Movements, &c.	Compass.
1—Coupler, Swell to Great.	Great—CC to g^3 in altissimo, 56 notes.
2—Coupler, Great to Pedal.	Swell—Tenor c to g^3 in altissimo, 44 notes.
3—Octave Pedal, already named.	Pedal—CCC to Tenor f, 30 notes, with
4, 5, 6—Three Composition Pedals.	extra octave of Pipes to complete the "Octave-Bass" compass.

1225. The Octave-Bass Coupler has frequently been introduced by Robson into his Organs, and has been found of great service in increasing the efficacy of a small Pedal Organ. More concerning this further on. It should be mentioned that the Pedal Bass has now become really a "16-feet Pedal," as the Germans term it.

1226. A difficulty that always attends the planning of a small English Organ of two Manuals, on the modern principle, is the satisfactory treatment of the Bass or 8-feet octave of the second Manual or Swell, owing to the size of the Stops that are justly considered to be indispensable for even the most limited departments of that kind to possess. In the instance of the second Manual or Choir Organ of the instruments of the last century, no such difficulty existed, on account of the Stops generally selected for that department being comparatively small ones—as Stopped Diapason, 8-feet *tone* (4-feet *literal* length); Principal, 4-feet, and so on: but now that the Swell invariably takes the precedence of the Choir Organ, and an Open Diapason, 8-feet, and at least one Reed Stop of the same size are required for even the smallest specimens of that division of an Organ, the case is very different.

1227. By way of illustrating the extent of this alteration and increase in the size of the Stops, the following experiment might be tried on a Tenor c Swell, containing the following six Stops—

1—Bourdon.....16 feet tone.	4—Principal..... 4 feet.
2—Open Diapason..... 8 feet.	5—Cornet, II ranks... $2\frac{2}{3}$ and 2 feet.
3—Stopped Diapason.... 8 feet tone.	6—Hautboy ..... 8 feet.

First, press down the Tenor c key, then draw the Bourdon, when a sound like that from a CC Stopped Diapason will be heard. The Open Diapason, when added, will sound like a Principal; the Stopped Diapason like a Flute; the Principal like a Fifteenth; the Cornet like a 2-rank Mixture; and the Hautboy like a Clarion. Thus it will be exemplified that the Tenor c Pipes of those six Swell Stops are as large as the CC Pipes of the following six Choir Stops—

1—Stopped Diapason .... 8 feet tone.	4—Fifteenth..... 2 feet.
2—Principal ..... 4 feet.	5—Mixture ..... 2-ranks.
3—Flute ..... 4 feet tone.	6—Clarinet ..... 8 feet tone.

That is to say, the Swell Stops of a modern Organ are ordinarily twice the size of the Choir Stops of old Organs. This will at once give an idea of the great amount of extra standing-room a Swell must require beyond what is necessary for a Choir Organ of the same number of Stops, even supposing the necessary additional funds to secure the more costly Stops in a complete form to be forthcoming; added to which, there is the price of the expensive "large wooden room" or box, to hold them, to be taken into account. A Swell, therefore, with all its Stops of complete compass, could scarcely be expected in an Organ for so small a Church as the above would be calculated; yet, on the other hand, it is very disadvantageous to the effect of the music, as well as unsatisfactory to the player, when the range of the second Manual Organ is far short of what it should be.

1228. To overcome this difficulty, the Bass octave of the Stopped Diapason and Principal in the Great Organ have sometimes been "borrowed;" that is to say, they have been made to act on the corresponding octave of the Swell Manual, without the remaining Great Organ Stops sounding. Something analogous to this in principle used to be effected by Harris, who, in some of his Organs, borrowed the two lowest octaves of his "Choir Organ" from the Great, as at St. Andrew Undershaft, by means of double grooves, one set for each Manual, and two sliders to each borrowed Stop, of which also one was for each Manual. Conveyances or grooves extended from the upper-boards over the one slider to the Bass Pipes over the other; and small leather valves were placed over each set of sound-board holes to prevent any of the wind that came up from one department of the Organ passing down into the other division. The borrowing, however, has been effected in various ways; as, for instance, by partitioning off a small portion of the single sound-board grooves, and providing pallets and sliders as before. All such contrivances are designed to arrive at the same end; though a borrowed Bass is far better than the plan of making the Swell keys below Tenor c act on the entire Great Organ, which is a very primitive device. Another plan has been to introduce a small "Choir Bass" to act on the Bass octave of the second Manual to meet the Swell. This is a better arrangement still, as the Stopped Diapason Bass and Principal, of which it is usually composed, can be scaled and voiced with some reference to the strength of the Swell Stops. Still this is not entirely satisfactory, as of course it cannot be made to match the Swell Stops equally well, whether the Swell-box be open or closed. Of the several methods that have been devised, none appear to be open to so little objection as the following.

1229. The Open Diapason might, to save room, be discontinued at the 4-feet c Pipe, as in the ordinary Tenor c Swell; but the Stopped Diapason could be carried down to CC, the longest Pipe of which would even then only be of the same 4-feet *length*, although its sound would be of 8-feet *pitch*. The Principal might also be carried right down; the lowest Pipe of which Octave Stop would even then be no longer than the Open Diapason Pipe of the octave above, that is, 4 feet. Lastly, the Reed could be mitred down without any detriment to its tone, but rather the contrary, and so be reduced to the 4-feet height; or, if free Reeds were to be used, a 4-feet tube would be all that would be required. In this way the 8-feet octave of Manual tones could be secured to the Swell without increasing the height of the Swell-box at all; by adding to its breadth to some extent, and to its depth to a less degree; while its sounds would be rendered susceptible of being increased or dimi-

nished with the rest of the Swell, which power of course cannot be secured by any of the other plans. Robson has made a few Swells in this way, which have shown the plan to be a most successful one.

1230. A mistake sometimes finds its way to the labels of the Pedal Couplers, which it is worth while to point out. It is generally understood that, of the two Claviers named on the label of a Coupler, the *first* is that of the row of keys coupled, and the second that of the one to which it is united. Thus, "Swell to Great" is understood to mean that the former is coupled to the latter, which is the case; but with the Pedal Coupler the names frequently get reversed, and, although the mechanism attaches the Great Organ to the Pedal, yet the label announces that it unites the "Pedal to Great."

III. SPECIFICATION FOR AN ORGAN WITH XVI SOUNDING STOPS, II MANUALS, AND PEDAL.

Great Organ, 9 Stops.

1—Bourdon.....16 feet tone.	6—Flute ..... 4 feet tone.
2—Open Diapason .... 8 feet.	7—Twelfth ..... $2\frac{2}{3}$ feet.
3—Dulciana to Tenor c. 8 feet.	8—Fifteenth ..... 2 feet.
4—Stopped Diapason .. 8 feet tone.	9—Clear Mixture,
5—Principal ..... 4 feet.	IV ranks..... $1\frac{1}{3}$ foot.

Swell Organ, 5 Stops.

10—Open Diapason .... 8 feet tone.	13—Cornet, II ranks ... $2\frac{2}{3}$ and 2 feet.
11—Stopped Diapason .. 8 feet.	14—Hautboy..... 8 feet.
12—Principal ..... 4 feet.	

Pedal Organ, 2 Stops.

15—Open Bass.....16 feet.	a—Octave Bass . { borrowed by means of a coupler, } 8 feet.
16—Stopped Bass .....16 feet tone	b—Flute Bass.. { borrowed by means of a coupler, } 8 feet tone.

Accessory Stops, Movements, &c.	Compass.
1—Swell to Great.	Great—CC to g^3 in altissimo, 56 notes.
2—Great to Pedal.	Swell—Tenor c to g^3 in altissimo, 44 notes.
3—Pedal Octave.	Pedal—CCC to Tenor f, 36 notes.

4, 5, 6, 7, 8—Five double-action Composition Pedals, to act on the Stops of the Great Organ in the following manner.

The first, to draw out the Dulciana, and reduce the full Organ to the same;
The second, to draw out the Diapasons, and reduce the full Organ to the same;
The third, to draw out to the Fifteenth, and reduce full Organ to the same;
The fourth, to draw out the full Organ; and
The fifth, to compound a Choir Organ, by drawing out the Stopped Diapason, Dulciana, Principal, and Flute, and reducing the full Organ to the same.

1231. The last Composition Pedal mentioned in the above scheme, although but seldom introduced, would prove of the greatest possible use in all small Organs which have no separate Choir Organ. It was tried for the first time (at the writer's suggestion) in the Organ built by Walker, for Trinity Church, Vauxhall Bridge, in

1852. As a Pedal of the kind does not belong to the series for increasing the strength of the Organ-tone by gradations from Piano to Forte, and for reducing it back again, but is designed to answer a distinct and special purpose, it had better be placed quite apart from the rest, say, to the extreme left, opposite to where the Swell Pedal is usually situated. The Bourdon is proposed to be acted on only by the Composition Pedal that is to draw out the full Organ; as its use is not governed by any laws analogous to those which regulate the employment of the other Stops, but is sometimes required in soft combinations, while at others it is not desired for much louder ones. For these reasons it will be better for it to be controlled chiefly by the hand.

1232. In many small English Organs, a Bourdon of 16-feet tone is placed on the second Manual, while all Stops of the same pitch are omitted from the first. This is not in accordance with the continental custom, as will be perceived on referring to any of the Specifications of small Organs contained in the Appendix. Neither is it in keeping with the theory on which is based the true method of establishing and developing the relative characters of tone of the different Manuals. According to that theory, if one Manual Organ is to be superior to the others in either of the three following particulars, namely, strength of tone, number of Stops, or in regard to the standard size or the size of tone of its largest Stops, that department should be the "Great" Organ; which, in fact, is so designated on those very accounts. It is not advisable, then, to place a Bourdon in the Swell, and yet no Stop of 16-feet pitch in the Great Organ; for, in that case, the tone of the former would be invested with greater gravity and fulness of tone than the latter.

1233. The addition to the Swell Specification is a Cornet of II ranks. A Stop of this kind, sounding a Twelfth and Fifteenth, was a favorite Stop with Nichols, the Organ-builder, who frequently introduced it into his small Swells with excellent effect.

1234. Two independent Pedal Stops are included in the Specification last given. Both those Stops are proposed to be of 16-feet; Flue Stops of that size or size of tone being the most important ones for the Pedal to have first, they forming the "Open and Stopped Basses" to the Diapasons of the Manual. Of scarcely less importance are the 8-feet Pedal Stops, which however are unattainable in an Organ of the size to which our Specification has at present attained. Where the Pedal Stops are few in number, it is a common custom with some English Organ-builders to introduce an Octave Pedal Coupler. This improves the general effect very considerably: for example, by uniting the 8-feet Pipes of, say, the 16-feet Pedal Stops just suggested, to the 16-feet Pedal key, and so on the octave throughout the Pedal compass, the two Stops are made to answer the purpose of four to a great extent. The drawbacks to their doing so quite effectually consists in there being no means for drawing the 8-feet range of one or both Stops with the 16-feet of the other—combinations that would frequently be advantageous.

1235. In an Organ lately built by the Messrs. Robson, for Newfoundland, a plan was tried, for the first time, which removed this objection. It was as follows—The CCC and CC grooves were placed side by side; the CCC sharp and CC sharp grooves the same; and so on throughout the sound-board; an extra octave being added at the end to complete the 8-feet range. Each Pedal roller was then provided

with two lowering arms, one communicating with the CCC pallet, the other operating on a second pallet in the CC groove. On the table were twice the usual number of sliders, six instead of three; that is to say, in addition to those for the three actual Stops, the same number was introduced for the borrowed octaves, and those for the 16-feet Stop and the borrowed octave were in each case placed side by side. The CCC and CC Pipes also stood side by side on the sound-board, to save conveyancing or grooving; and all the other Pipes were arranged in the same manner. By these means the independence of the 8-feet range was so completely established that it was scarcely possible to discover that there were less than twice as many actual Stops as really existed. The mechanism necessary to accomplish all this, however, involved a considerable outlay.

IV. SPECIFICATION FOR AN ORGAN WITH XX SOUNDING STOPS, II MANUALS, AND PEDAL.

Great Organ, 10 Stops.

1—Bourdon ..... 16 feet tone.
2—Open Diapason .... 8 feet.
2—Dulciana to Tenor c . 8 feet.
4—Stopped Diapason... 8 feet tone.
5—Principal..... 4 feet.
6—Stopped Flute ..... 4 feet tone.
7—Twelfth..... $2\frac{2}{3}$ feet.
8—Fifteenth..... 2 feet.
9—Clear Mixture, IV ranks..... $1\frac{1}{3}$ foot.
10—Trumpet..... 8 feet.

Swell Organ, 8 Stops.

11—Bourdon..... 16 feet tone.
12—Open Diapason .... 8 feet.
13—Stopped Diapason.. 8 feet tone.
14—Principal..... 4 feet.
15—Mixture, IV ranks.. $2\frac{2}{3}$ feet.
16—Hautboy..... 8 feet.
17—Horn ..... 8 feet.
18—Clarion ..... 4 feet.

Pedal Organ, 2 Stops.

19—Open Bass..... 16 feet.
20—Stopped Bass ..... 16 feet tone.
a—Octave Bass {borrowed, as before,} 8 feet.
b—Bass Flute {borrowed, as before,} 8 feet tone.

Accessory Stops, Movements, &c.

1—Coupler Swell to Great.
2—Coupler Great to Pedal.
3—Pedal Octave.
4, 5, 6, 7, 8—Composition Pedals as before.

Compass.

Great—CC to g^3 in altissimo, 56 notes.
Swell—Tenor c to g^3 in altissimo, 56 notes.
Pedal—CCC to Tenor f, 30 notes, with extra octave of Organ, to complete the octave range.

Composition for Swell Mixture.

Tenor c to treble f^2..... 12—15—19—22.
Treble $f^2\sharp$ to b^2 in alt.... 8—12—15—19.
c^3 in alt. to the top ..... 1— 8—12—15.

1236. In Germany, a satisfactory Specification for a 10-Stop Great Organ always includes one Flue Stop of 16-feet tone, three or four of 8-feet, two of 4-feet,

and a Compound Stop of from III to VI ranks. This skeleton scheme cannot be improved upon, and there is the less occasion for even making the attempt, since there is so much room for indulging individual taste, in making the selection of Stops wherewith to fill it up.

1237. It will be seen that the "Double" in the Great Organ is proposed to be Stopped throughout (Bourdon), and not open in the Tenor and Treble, as it is sometimes made in England. The continental rule is, that when there is but one Stop of 16-feet pitch on a Manual, that should be a Covered Stop (see Specifications Nos. 8, 24, 25, 30, 34, 35, 36, 37, 38, 44, &c. in Appendix); and to this rule very few exceptions, indeed, exist (see, however, Nos. 6, 7, 25, and 104, in Appendix). A Bourdon, or kindred Stop, is first introduced, because it is more prompt in its speech than a Double Open Diapason; because it thickens the Organ-tone so admirably, without rendering the sub-octave sound so weighty and sonorous as to confuse it with the unison pitch in soft combinations; and because it is the less expensive Stop, and also requires less standing and speaking room. For these several reasons, its adoption has been recommended above. Sometimes a Quintaton, 16 feet (Fifth-sounding Covered Stop, 16 feet size of tone) is found proposed, as in Foreign Specifications, Nos. 44, 45, 46, 47, &c. A Stop of the kind is not designed to give its actual tone purely, but to produce its Twelfth, of $5\frac{3}{3}$ feet, as strongly as its ground-tone. The original design of such a Stop is to obtain the effect of two from one rank of Pipes, on which account the Stop in question is, in Germany, termed a "simple mixed Stop." It of course is never intended to be used by itself.

1238. The Flute on the Great Manual of the Organ at Hampton Court, by Father Smith, is really a Quintaton of 4-feet ground-tone. It is formed of metal Pipes, with metal caps *without* chimneys.

1239. It will be observed that the composition suggested for the Swell Chorus Stop is identical with the Sharp Mixture, in the upper octave and a half of its compass. This has been proposed for the following reason: the Swell Compound-stop may almost be said to be never used without the Reeds, and consequently only at such times when there is a great body of 8 and 4 feet tone to support it. Moreover, when a Mixture is enclosed in a box, the tone of its acute Pipes does not then stand out so prominently; but, on the contrary, when used in conjunction with the other Stops, including a Bourdon, which is now generally and very properly included in every 7 or 8 Stop Swell, simply imparts a bell-like and playful ring to the whole. The Great Organ Mixtures are frequently required to be used "without Reeds;" and, in fact, it is one of the tests of their goodness, that they should be capable of being employed in that way with perfectly good effect. But as the unison tone of the Flue-work of a Great Organ to the above Specification would be scarcely strong enough to cope with a full-toned Sharp Mixture, one consisting of a composition more nearly allied to that of the Treble of certain excellent old Compound Stops has been suggested instead. The old builders were sometimes very successful in this matter of obtaining great boldness and power from their Mixtures without the use of very small Pipes in the Treble. The modern builders are generally more successful than the old, save Byfield, in obtaining a fine and powerful, yet rich, smooth, and equal quality of tone from their Reeds, of which class of Stops four are included in the foregoing Specification.

1240. What has been said in respect to the Sharp Mixture composition for the Swell, applies also to the introduction of the 4-feet Reed into that department. The Clarion imparts a silvery character to the general effect of the Swell that is most charming; and not only so, but the Stop is there constantly available for accompanimental purposes, as well as for solo playing.

V. SPECIFICATION FOR AN ORGAN OF XXVIII SOUNDING STOPS, III MANUALS, AND PEDAL.

Great Organ, 10 Stops.

1—Bourdon ..... 16 feet tone.	6—Stopped Flute, wood. 4 feet tone.
2—Open Diapason..... 8 feet.	7—Twelfth ..... 2⅔ feet.
3—Spitzflöte, or Gamba, 8 feet.	8—Fifteenth..... 2 feet.
4—Stopped Diapason, Metal Treble ..... 8 feet.	9—Sharp Mixture, V ranks ..... 2 feet.
5—Principal ..... 4 feet.	10—Trumpet ..... 8 feet.

Swell Organ, 9 Stops.

11—Bourdon ..... 16 feet tone.	16—Mixture, IV ranks.. 2⅔ feet.
12—Open Diapason..... 8 feet.	17—Hautboy ..... 8 feet.
13—Stopped Diapason .. 8 feet tone.	18—Horn..... 8 feet.
14—Principal ..... 4 feet.	19—Clarion ..... 4 feet.
15—Fifteenth ..... 2 feet.	

Choir Organ, 5 Stops.

20—Dulciana ..... 8 feet.	22—Principal ..... 4 feet.
21—Stopped Diapason—wood ..... 8 feet tone.	23—Stopped Flute, metal, 4 feet tone.
	24—Clarionet, to Tenor c, 8 feet.

Pedal Organ, 4 Stops.

25—Open Bass..... 16 feet.	27—Principal Bass ..... 8 feet.
26—Stopped Bass..... 16 feet tone.	28—Posaune, wooden tubes, 16 feet.

Accessory Stops, Movements, &c.	Compass.
1—Swell to Great.	Great—CC to g^3 in altissimo, 56 notes.
2—Great to Pedal.	Swell—Tenor c to g^3 in altissimo, 44 notes.
3—Choir to Pedal.	Choir—CC to g in altissimo, 56 notes.
	Pedal CCC to Tenor f, 30 notes.

4, 5, 6, & 7—Four double-action Composition Pedals, to act as follows:
4, to draw out Diapasons (2, 3, and 4), and reduce full Organ to the same.
5, to draw out to Fifteenth, and reduce full Organ to the same.
6, to draw out full Organ without Reed, and draw in Trumpet.
7, to draw out full Organ.

1241. In the above fifth Specification, the third Manual (Choir Organ) appears in these plans for the first time, the utility of which department can scarcely be overestimated. The Great Organ has the same number of Stops as before, but the Dulciana is transferred from that department to the Choir Organ, to which latter division it more correctly belongs, and a Spitzflote or Gamba proposed in its stead.

1242. Three distinct Stops have, at various times, been made in England under the one name Gamba. There is the cylindrical Gamba, that is to say, of "Principal" shape, though not of Principal scale: the Bell Gamba, invented by Hill; and the Cone Gamba, i. e. without the bell, as introduced by Hill in his Stepney and Panopticon Organs. The two former are distinctly of a reedy tone; while the latter has more of the Diapason character about its sound, and is frequently called, in Germany, *Spitzflöte* (Spire-flute, from its tapering outline). Two names are inserted in the place for the third Stop in the foregoing Great Organ Specification, to intimate that either a kind of "second Open Diapason," or a Stop of greater contrasting tone to that of the governing Diapason, might there be appropriately introduced, the name Spitzflöte being intended to refer to the smoother-toned Stop, and that of Gamba to the others of more cutting intonation. A Gamba, when of strong pungent tone, is of great utility, both for leading voices, and for part-playing, after the manner of a string quartett. Moreover, when added to the Diapasons, it produces an effect in some respects resembling that arising from the coupling on of the Unison Swell Reeds, with the advantage that the Swell is left entirely independent of the Great Organ, and can be prepared for any subsequent effect that may be necessary. The custom, so general in England, of coupling the Swell with Reeds to the Great Diapasons, is an interesting instance of the means by which Organists have *compounded* a particular kind of Organ-tone which they felt to be at times advantageous for purposes of accompaniment, but for the production of which no special Stops were introduced into the English Organ until within the last few years. When the above combination is prepared, the Reeds impart a certain crispness and decidedness to the tone, which is precisely the effect produced by a strong-toned Gamba.

1243. The effect of a second Open Diapason would of course be to increase the quantity of smooth unison-tone. Most English Organs of the size represented in the preceding Specification, would contain the repetition in question; whereas very few of the Continental instruments include any such duplication of the equivalent Stop; i. e. of the "Principal, Prestant, or Octave of 8 feet." The Organs at Rotterdam, Freiburg, and Tours, offer exceptions to the rule (see Foreign Specifications, Nos. 2, 16, and 110, which, however, are all much larger instruments). It might therefore be supposed that the foreign Organs do not contain any Stop corresponding with the English "second Open;" which inference, however, would only be correct so far as the *name* is concerned, for they very generally do possess a second Unison Open Metal Flue Stop of rather strong tone. It is true, indeed, that they usually present but one "Principal, or *most* important Stop of 8 feet," which, forming the basis from which the length and scale of the whole series of Harmonic corroborating Stops are calculated, thus constitutes the *diapason* thereto; but then they have, in lieu of a second Stop of that same name and size, some member of the Flute-work, which is selected according to the character of tone it is desired the "second Open" shall produce.

1244. The point of difference, therefore, in this particular, between the English and the Continental system, is this—that whereas in this country the second open Stop is almost always labelled "Open Diapason," although its tone may differ much, and advantageously so, from the full and sonorous character of that of the first Stop of the same name; in Germany, the several varieties of tone are, on the contrary, produced from as many different kinds of Stops, each of which has something peculiar

in its *form* to distinguish it to the Organ-builder; something special in its *tone* to distinguish it to the auditor; and something distinct in its *name* to distinguish it to the Organist. Thus, in some German Organs, we find a "second Open," slightly conical in form, producing a rather lighter tone than the first, of a slightly flutey quality, and bearing the inscription "*Spitzflöte 8 feet.*" In others, we find the second 8-feet open Stop more conical than the last-mentioned, producing a clear, piping, and chirping quality of tone, and labelled "*Gemshorn 8 feet.*" Other Organs contain a second open Stop, that is more or less reedy in tone, and larger or smaller in scale, bearing the name *Gamba, Salicional, Geigen Principal,* &c. as the case may be. Any Specification in the Appendix may be referred to for an illustration of these particulars.

1245. The origin of the introduction of a second Open Diapason into the English Organ is possibly connected in some way with the custom, prevalent in the seventeenth century, of erecting the Organ on the choir screen, which rendered a "double front" necessary, demanding two sets of *cylindrical* Pipes wherewith to adorn them. And it is worthy of observation, that although Father Smith frequently introduced "two Opens," he generally voiced the smallest one so that it produced a tone partaking in some degree of the peculiar flutey quality of the German *Spitzflöte.* The custom of introducing two Open Diapasons has prevailed very generally in England, from the time of Smith and Harris down to our own.

1246. The particular, however, in which the English system is felt to be insufficient, is, in its not possessing any nomenclature whereby the Stops producing the several characters of tone can be distinguished and specially referred to. That the adoption of something of the kind would prove advantageous, there can scarcely be a second opinion. All must have experienced the convenience of being able, for instance, to distinguish a Dulciana from an Open Diapason by a *name* instead of a *description,* and a Keraulophon from both by the same simple means.

1247. The second Open Diapason is sometimes indeed labelled "*small* Open;" but this addition only refers to the scale of the Stop, and not to the quality of its sound, which may vary considerably in different examples. Moreover, one builder's "small" Open will not unfrequently nearly equal in size the "large" Open of another. What the performer requires most especially, is a key to the tone-character of the Stop; and if some special term could be applied to every Stop, the sound of which differed from that of the actual "Diapason," such a series of names would doubtless prove most acceptable. Under this impression, the second unison open Stop on the Great Manual of the last Specification is marked "Spitzflöte 8 feet;" for which, however, some other 8-feet Stop could be substituted, or even the hitherto usual English Stop and terminology, if preferred.

1248. In selecting the particular kind of Stopped Diapason and Flute for the Great and Choir Manuals, a better opportunity is afforded for the exercise of individual choice, than is the case with almost any other class of Stops in an Organ. It was a frequent custom with the younger Harris to make the Treble of his Choir Stopped Diapason and Flute of metal, as in the late Doncaster Organ; while the younger Smith as often made his both of wood throughout, as at Finedon. The elder Smith, on the contrary, frequently made the two Stops of a different kind of material; so that if the Stopped Diapason was of wood, the Flute would be of metal, as in the Choir

Organ at the Temple; and when the Stopped Diapason was of metal, the Flute was of wood, as on the Great Manual at the Temple. In a few cases, he made the one Stopped and the other Open, as in the Durham Cathedral Organ, where, to a Stopped Diapason of wood on the Great and Choir Organs, a Hohlflöte of octave pitch was placed in each instance.

1249. The "crossing" of the Stopped Diapason and Flute, in regard to their material, after the manner adopted by the elder Smith, has long been a prevalent practice, though by no means an invariable one, with the German Organ-builders. It was followed by Silbermann in his fine instruments at Dresden, in the Choir Organs of each of which it will be seen, on referring to Specifications Nos. 79, 80, 81, and 82, that to a "Gedact of 8-feet tone" he introduced a "Rohrflöte of 4-feet tone." It will be noticed, also, that to the "Gedact of 8-feet tone" in the Choir, he in each case disposed a "Rohrflöte of 8-feet tone" in the Great Organ.

1250. By making one of the Covered Stops on the same Manual of wood, and the other of metal, greater individuality of character in the tone is obtained from each than is usually secured by the voicing alone; and by making two Stops of similar nature on two different Manuals—as, for instance, the Stopped Diapasons on the Great and Choir Organs—of different materials, a nice, mild contrast is caused to exist even between Stops which (in England, at any rate) usually bear the same name.

1251. The plan of making the Covered Stops of 8 and 4 feet tone "cross," has been adopted by Mr. Hill for the Choir Organ of his noble instrument at the Panopticon; it has also been followed by Mr. Walker for some years past.

1252. In most of the preceding Specifications, as well as that just given, a Stopped Diapason and Stopped Flute have been proposed for the Great Organ department; in lieu of which, however, a Clarabella and Wald-flute are sometimes preferred. It may, therefore, be well to state under what circumstances these substitutions may be made with good effect. It is the nature of all good Stops of Flute quality of tone, whether they be stopped or open, metal or wood, to impart to the metal tone of those members of the Diapason-work with which they sound in unison, a certain fulness and mellowness of effect not attainable without them: and this mollifying influence is exercised to the most beneficial extent when the Flute sound is fully proportioned to that of the metal, yet without being so strong as to prevent its mixing perfectly with, and merging, as it were, in the metal tone. For an Organ that is to be lightly and sweetly voiced, somewhat after the Green model, for instance, a Stopped Diapason and Stopped Flute would answer best; as a Clarabella and Wald-flute would in that case be likely to produce rather a "hooting" effect through the light foundation and Chorus-work. Instead of simply imparting body and breadth to the Open Diapason and Principal, they would tend to obscure the predominance and "glisten" of the metal quality by their nearer equality of strength, and would thus serve only to thicken and deaden the tone. But if the Diapason and Harmonic series of Stops are to be boldly and fully voiced, a Clarabella and Wald-flute might be advantageously introduced; for the reasons that, while they would be covered by the peal of the ringing Mixtures, they would in their turn assist in supporting them by the broader effect which they would impart to the unison and octave sounds.

1253. The Clarabella is generally of excellent quality in the upper octave and a half of its compass, being clear and smooth, yet powerful; but in the middle octave its tone is sometimes thick and woody, probably on account of the largeness of its scale. In the German equivalent for the above-named English Stop—the Hohl-flute—the Pipes increase in bulk far more gradually downwards, yet the most perfect evenness of quality is preserved. The Piccolo, which now appears in the Great Organ Specifications for the first time, completes the Flute or wood Organ, consisting of the Bourdon, Stopped Diapason, Flute, and Piccolo—a series of Stops of the greatest service for purposes of accompaniment and for solo playing.

1254. The Swell Organ may now be assumed to be of its full and proper compass. This completeness of range is not only of the highest importance in the eyes of those who sufficiently estimate *correct* playing, but it admits of the introduction of octave and sub-octave couplers, which place at the disposal of the Organist a number of combinations not otherwise attainable from the same instrument. A singular mistake is sometimes made in the labelling of the Swell octave coupler, which it is necessary to notice. The coupler in question is frequently marked *super*-octave, which would indicate that it operates in the 2-feet pitch, whereas it in reality acts in the *single* octave or 4-feet pitch. This error is the more confusing where the terms octave or super-octave are applied to any of the 4 or 2 feet Organ Stops.

VI. SPECIFICATION FOR AN ORGAN OF XXVI SOUNDING STOPS, II MANUALS, AND PEDAL.

Great Organ, 12 Stops.

1—Bourdon.....16 feet tone.	7—Twelfth..... $2\frac{2}{3}$ feet.
2—Open Diapason .... 8 feet.	8—Fifteenth..... 2 feet.
3—Spitzflote..... 8 feet.	9—Piccolo..... 2 feet.
4—Stopped Diapason .. 8 feet tone.	10—Sharp Mixture, V ranks, 2 feet.
5—Principal..... 4 feet.	11—Trumpet..... 8 feet.
6—Stopped Flute ..... 4 feet tone.	12—Clarionet..... 8 feet tone.

Swell Organ, 10 Stops.

13—Bourdon.....16 feet tone.	18—Fifteenth..... 2 feet.
14—Open Diapason .... 8 feet.	19—Mixture, IV ranks.. $1\frac{1}{3}$ foot.
15—Stopped Diapason .. 8 feet tone.	20—Hautboy..... 8 feet.
16—Gamba to Tenor c .. 8 feet.	21—Horn..... 8 feet.
17—Principal..... 4 feet.	22—Clarion..... 4 feet.

Pedal Organ, 4 Stops.

23—Open Bass, wood....16 feet.	25—Principal Bass, metal . 8 feet.
24—Stopped Bass, wood..16 feet tone.	26—Posaune, wooden tubes.16 feet.

Accessory Stops, Movements, &c.	Compass.
1—Swell to Great.	Great—CC to g^3 in altissimo, 56 notes.
2—Great to Pedal.	Swell—CC to g^3 in altissimo, 56 notes.
3—Swell to Pedal.	Pedal—CCC to Tenor f.... 30 notes.
4—Swell Octave.	
5—Swell Sub-octave.	

6, 7, 8, 9—Four Composition Pedals, as before.

1255. The Octave and Sub-octave Couplers are usually made to attach the "Swell to Great;" but it is a question whether they would not be the source of even a greater number of excellent combinations than usual, if they were in the first instance made to operate upon the Swell itself in the octave above and below. In that case, the octave sound, each way, that is to say, upward and downward, could be concentrated on a single Swell key—provided only that the octave be within the standard compass of the Manual—which would afford means for drawing from the Swell many effects that are not attainable when the Couplers operate in the more usual way. The Octave and Sub-octave Swell Couplers would thus be freely available, without the independence of the Great Organ being *of necessity* lost for the time being. Then, if either the Octave or the Sub-octave effects, or both, were required *in conjunction* with the Great, these would still be obtainable by drawing the usual Coupler Swell to Great; when, of course, every key united to the Swell unison would also descend, on that key being drawn down by the corresponding key of the Great Organ. The only effect lost would be that of attaching the Swell to the Great in the Octave and Sub-octave, *without* the Swell unison.

1256. Several excellent Pedal effects would also then be placed at the Organist's command. For instance, the Swell—with the "Swell Octave" drawn—on being coupled to the Pedal, would, by means of the Clarion, produce the effect of a 2-feet Reed, and thus impart to the Pedal entry of a subject a great amount of point and brightness: or, with the Sub-octave drawn, which would attach the CC Swell key to the second c of the Pedals, and consequently bring the 16-feet CCC Bourdon *tone* on to the same CC Pedal, the effect of a light Pedal Stop of 32-feet tone would be obtained through the octave and a half of the Pedal range from that key upwards.

1257. Octave and Sub-octave Couplers occur in most of the Italian Organs, whether of ancient or recent date. It would be interesting to know positively the exact period of the introduction of such useful movements. The Unison Coupler would naturally be the first kind thought of; and from the prominent way in which that description of Accessory Stop is mentioned in the old account of the Lucerne Organ (Foreign Specifications, No. 114), it is not improbable that a Clavier Coupler was, at the period of the construction of that instrument, 1561, then positively a new feature in Organ-building, or at any rate a great novelty in the science.

VII SPECIFICATION FOR AN ORGAN OF XXXVI SOUNDING STOPS, III MANUALS, AND PEDAL.

Great Organ, 13 Stops.

1—Bourdon ..... 16 feet tone.
2—Open Diapason.... 8 feet.
3—Spitzflote..... 8 feet.
4—Stopped Diapason.. 8 feet tone.
5—Principal..... 4 feet.
6—Stopped Flute.... 4 feet tone
7—Twelfth..... $2\frac{2}{3}$ feet.
8—Fifteenth..... 2 feet.
9—Piccolo..... 2 feet.
10—Full Mixture, III ranks .. 2 feet.
11—Sharp Mixture, IV ranks..$1\frac{1}{3}$ foot.
12—Trumpet..... 8 feet.
13—Clarion..... 4 feet.

Swell Organ, 10 Stops.

14—Bourdon..... 16 feet tone.	19—Fifteenth..... 2 feet.
15—Open Diapason .. 8 feet.	20—Mixture, IV ranks. $1\frac{1}{3}$ foot.
16—Stopped Diapason, metal treble .. 8 feet tone.	21—Hautboy ..... 8 feet.
	22—Horn..... 8 feet.
17—Bell Gamba .... 8 feet.	23—Clarion..... 4 feet.
18—Principal..... 4 feet.	

Choir Organ, 7 Stops.

24—Open Diapason ... 8 feet.	27—Spitzflote ..... 4 feet.
25—Stopped Diapason, wood ..... 8 feet tone.	28—Metal Flute .... 4 feet tone.
	29—Gemshorn..... 2 feet.
26—Dulciana..... 8 feet.	30—Clarionet, to Tenor c 8 feet tone.

a—Pedal Organ, 6 Stops.

31—Open Bass, wood.. 16 feet.	34—Principal Bass, metal 8 feet.
32—Stopped Bass, wood 16 feet tone.	35—Flute Bass, wood.. 8 feet tone.
33—Great Quint, Bass, wood, stopped..$10\frac{2}{3}$ feet tone.	36—Posaune, wooden tubes..... 16 feet.

b—Pedal, 6 Stops.

1—Open Bass ..... 16 feet.	4—Fifteenth Bass.... 4 feet.
2—Stopped Bass .... 16 feet tone.	5—Mixture, V ranks.. $3\frac{3}{5}$ feet.
3—Principal Bass .. 8 feet.	6—Posaune..... 16 feet.

c—Pedal, 6 Stops.

1—Open Bass ..... 16 feet.	4—Posaune..... 16 feet.
2—Principal Bass ... 8 feet.	5—Trumpet..... 8 feet.
3—Fifteenth Bass ... 4 feet.	6—Clarion ..... 4 feet.

Accessory Stops, Movements, &c.

1—Coupler Swell to Great.	6—Swell to Pedal.
2—Swell Octave.	7—Choir to Pedal.
3—Swell Sub-octave.	8, 9, 10, 11, Four Composition Pedals to Great.
4—Choir to Great.	
5—Great to Pedal.	12, 13, Two Composition Pedals to Swell.

Compass.

Great, CC to g^3 in altissimo, 56 notes.
Swell, the same.
Choir, the same.
Pedal, CCC to Tenor f, 30 notes.

1258. Three distinct plans are given for a Pedal of 6 Stops in the foregoing Specification. The first contains a Great Quint Bass, of $10\frac{2}{3}$ feet tone; which Stop, though but little used in England, is capable of great effect. Many German and Flemish Organs produce a mild, yet distinct, 32-feet tone from a Pedal Organ, which nevertheless contains no Stop of that pitch. The sounds which would be supposed to proceed from such a Stop are in reality only an "acoustical illusion," resulting from the introduction of a Stop of the above kind; every *third* vibration of

which coincides with every *second* vibration of the 16-feet Stops, and with every *fourth* vibration of the 8-feet Stops; which, together, so reinforce the periodical vibrations which occur thirty-two times in a second, that they produce the effect above mentioned. Where room and expense are objects, and no Sub-Bourdon is therefore obtainable, the above plan of obtaining the deepest musical tones, by making the phenomenon of sub-harmonic sounds subservient to practical use, might advantageously be adopted, particularly as the additional Stop necessary to produce them is of no greater length than a Pedal Twelfth.

1259. The second plan for a 6-Stop Pedal Organ is a favorite English scheme; while the third is almost a literal reproduction of one held in high esteem by Silbermann and other German builders. See Specifications in Appendix, Nos. 22, 26, 79, 81, &c. The first of the three schemes appears, on the whole, to be the best adapted for the accompaniment of the English Church Service, whether Choral or Congregational; while the second unquestionably would form the best Chorus Organ. In many Continental Churches, the Canto Fermo, or melody of the old Church Chant, thundered forth in unison by a large choir of Priests, is made the *Bass* in the accompaniment, the harmony appearing as a kind of superstructure; the effect of which arrangement of the parts is frequently most commanding. For this kind of use the third Specification, with its three octaves of Reeds—16, 8, and 4 feet—would be the best; it being equal to the production of the most impressive effects when employed in this manner.

1260. The consideration of the above three Pedal Specifications offers a striking illustration of the immeasurable superiority of the system of Organ-building which treats the Pedal as an independent department of an Organ, over that which recognizes the extension of the Manuals down below CC as a substitute for it. In the former case, several plans, consisting of the same number of Stops, but very dissimilar in their selection, each possessing merits of its own, and each specially adapted to answer a distinct end, can be prepared, and from these a final selection be made, according to special requirements; whereas in the latter this is not possible, for the very existence of the Pedal as an independent and important division of an Organ is then scarcely recognised.

VIII. SPECIFICATION FOR AN ORGAN OF FIFTY SOUNDING STOPS, THREE MANUALS, AND PEDAL.

Great Organ, 17 Stops.

1—DoubleOpenDiapason	16 feet.	10—Twelfth.....	$2\frac{2}{3}$ feet.
2—Bourdon.....	16 feet tone.	11—Fifteenth.....	2 feet.
3—Open Diapason....	8 feet.	12—Piccolo.....	2 feet.
4—Spitzflote.....	8 feet.	13—Full Mixture, III ranks.....	2 feet.
5—Stopped Diapason—metal Treble	8 feet tone.	14—Sharp Mixture, V ranks.....	$1\frac{3}{5}$ foot.
6—Quint.....	$5\frac{1}{3}$ feet.	15—Double Trumpet..	16 feet.
7—Principal.....	4 feet.	16—Posaune	8 feet.
8—Gemshorn.....	4 feet	17—Clarion.....	4 feet.
9—Stopped Flute—wood	4 feet tone.		

Swell Organ, 12 Stops.

18—Bourdon..... 16 feet tone.
19—Open Diapason.... 8 feet.
20—Stopped Diapason .. 8 feet tone.
21—Bell Gamba — to Tenor c..... 8 feet.
22—Principal..... 4 feet.
23—Open Flute ..... 4 feet.
24—Twelfth..... $2\frac{2}{3}$ feet.
25—Fifteenth..... 2 feet.
26—Mixture, IV ranks.. $1\frac{1}{3}$ foot.
27—Hautboy..... 8 feet.
28—Horn ..... 8 feet.
29—Clarion..... 4 feet.

Choir Organ, 10 Stops.

30—Open Diapason.... 8 feet.
31—Stopped Diapason—wood..... 8 feet tone.
32—Dulciana—to Tenor c 8 feet.
33—Keraulophon — to Tenor c.. ..... 8 feet.
34—Spitzflote..... 4 feet.
35—StoppedFlute—metal 4 feet tone.
36—Gemshorn ..... 2 feet.
37—Flageolet..... 2 feet.
38—Mixture, II ranks $1\frac{1}{3}$ foot.
39—Corno de Bassetto—throughout..... 8 feet tone.

Pedal Organ, 11 Stops.

40—Sub-Bass—stopped . 32 feet tone.
41—Open Bass—metal.. 16 feet.
42—Great Bass—wood.. 16 feet.
43—Stopped Bass—wood 16 feet tone.
44—Quint Bass—stopped $10\frac{2}{3}$ feet tone.
45—PrincipalBass—metal 8 feet.
46—Flute Bass—wood.. 8 feet tone.
47—Fifteenth Bass .... 4 feet.
48—Mixture, V ranks .. $3\frac{1}{3}$ feet.
49—Trombone..... 16 feet.
50—Trumpet ..... 8 feet.

Accessory Stops, Movements, &c.

1—Coupler Swell to Great.
2—Coupler Choir to Great.
3—Swell Octave.
4—Swell Sub-octave.
5—Great to Pedal.
6—Swell to Pedal.
7—Choir to Pedal.
8—Pedal Ventil.
9—Tremulant to Swell.
10, 11, 12, 13—Four Composition Pedals to the Great Organ.
14, 15—Two Composition Pedals to the Swell Organ.

Compass.

Great, CC to g^3 in altissimo, 56 notes.
Choir, the same.
Swell, the same.
Pedal, CCC to Tenor f, 30 notes.

As a Solo Organ to the above, the following 4 Stops would form a good addition; to be operated upon by a fourth Manual.

1—Diapason Harmonic. 8 feet.
2—Flute Harmonic.... 4 feet.
3—Tuba..... 8 feet.
4—Tuba Clarion..... 4 feet.

There should in that case be two Couplers; namely, one to unite "Solo to Great," and a second to attach "Solo to Pedal."

1261. A German Great Manual Organ, containing 16 Stops, is usually furnished with two or three Stops of 16 feet, a Quint, and two Metal Open Flue Stops of 4 feet. All these excellent features are embodied in the plan for the Great Organ department

of the preceding Specification. The Great Organ has, in fact, now become strictly a "16-feet" Organ. Two Principals, like two Open Diapasons, have frequently been introduced into large English Organs, as in the fine Instruments at St. Sepulchre's, Snow Hill; Christ Church, Spitalfields; Hereford Cathedral; Winchester Cathedral, &c.; and when there is much Mixture-work above, a second Stop of the kind, or nearly allied to it, is a most advisable one for an Organ to have, as it strengthens the medium tone of the Instrument materially. As, however, German Organ-builders seldom "repeat themselves," the second 4-feet Open Metal Stop in their Specifications is never a repetition of the Principal, but more generally a member of the Flute-work, as a Gemshorn or a Spitzflote of 4 feet. Sometimes the Stop in question is an Octave to the 8-feet Stop, occupying the position corresponding to our second Open Diapason, as in Foreign Specifications, Nos. 55, 58, 65, 83, &c. More frequently, however, the Spitzflote and Gemshorn "cross," after the manner of the Stopped Diapason and Flute, as already detailed; i. e. if the 8-feet Stop be a Gemshorn, the 4-feet will be a Spitzflote, and *vice versâ*, as in Foreign Specifications, Nos. 80, 82, &c. The latter plan is the most highly esteemed in Germany, and is therefore suggested above.

1262. But the above Great Organ Specification contains 17 Stops. This number has been preferred, since it allows of the incorporation of the Piccolo of 2 feet, which Stop is less highly esteemed in Germany than in England; and therefore does not usually appear on the 16-Stop Great Manuals of the former country.

1263. As the full-compass Swell presents a second complete Manual Organ composed of cylindrical Stops, a few Stops of tapering outline might be proposed for the Choir Organ, for the purpose of obtaining greater individuality of tone, if preferred. Thus a Spitzflote of 4 feet, and a Gemshorn of 2 feet, have been suggested in lieu of the usual Principal and Fifteenth, after a plan that was much in favor with Father Smith. The Stops will be seen to be half the size of the similarly named Stops in the Great Organ; but in some German Organs, the Flute-work of the Choir is made to "cross" that of the Great Organ, after the manner of the Covered-work. Thus, if the Great has a Spitzflote of 8 feet and a Gemshorn of 4 feet, the Choir would have a Gemshorn of 8 feet and a Spitzflote of 4 feet; so that there are many ways of varying a Specification with good effect.

1264. It has sometimes been the custom in England to put a Double Reed in the Swell, and not one in the Great Organ. This, however, is quite contrary to the practice of the French and German Organ-builders, as well as being counter to the general theory of Organ-building already detailed, when speaking of the introduction of the Double Diapason; and the plan has therefore not been recommended here. Moreover, there is the less reason for making such a deviation from the usual course, since such excellent 16 feet Reed effects can be obtained from the Swell through the instrumentality of the Sub-octave Coupler.

1265. It is a rule with German Organ-builders, that when a Pedal Organ contains 10 Stops, it should include a Stop of 32 feet size of tone. Sometimes a Stop of that pitch occurs even in a Pedal of 7 or 8 Stops. A Mixture, however, is seldom included in a 10-Stop German Pedal. This latter Stop is nevertheless too highly and justly appreciated in England to be omitted here; and the preceding Specification is therefore made to consist of 11 Stops, that it may be included.

1266. Most German Pedals of 4 Stops and upwards contain a "Violone of 16 feet." This is a particularly fine Stop; but, being at present entirely unknown in this country, it has not been proposed in these Specifications. It is an Open Stop, usually of wood, and of small scale, the block of the 16-feet CCC generally measuring only $5\frac{1}{2}$ inches by 7 inches. It forms the "Pedal Bass" to the Gamba and other string-toned Manual Stops. Its intonation is very crisp and pungent, and is in close imitation of the bowing on a large string instrument; hence its name Violone (Double Bass).

1267. In the Organ at Cologne Cathedral, the 16 Violone Pipe measures as much as 12 inches across the mouth, and is, from its great scale, called "Contra Violone." When heard from the Choir of the Cathedral, its tone is very like a fine Pedal Diapason combined with a soft 16-feet Reed of equal quality and accurate intonation.

IX. SPECIFICATION FOR AN ORGAN OF NINETY STOPS, FOUR MANUALS, AND PEDAL.

Great Organ, 25 Stops.

1—Sub Bourdon, to the Tenor c key..... 32 feet tone.
2—Double Open Diapason 16 feet.
3—Bourdon..... 16 feet tone.
4—Open Diapason .... 8 feet.
5—Open Diapason .... 8 feet.
6—Spitzflote ..... 8 feet.
7—Gamba ..... 8 feet.
8—Stopped Diapason—metal ..... 8 feet tone.
9—Clarabella, to Tenor c 8 feet.
10—Quint..... $5\frac{1}{3}$ feet.
11—Principal ..... 4 feet.
12—Gemshorn ..... 4 feet.
13—Stopped Flute, wood 4 feet tone.
14—Wald Flote, to Tenor c 4 feet.
15—Twelfth..... $2\frac{2}{3}$ feet.
16—Fifteenth ..... 2 feet.
17—Piccolo..... 2 feet.
18—Sesquialtera, II ranks $2\frac{2}{3}$ & $1\frac{3}{5}$ feet.
19—Full Mixture, III ranks... ..... 2 feet.
20—Sharp Mixture, V ranks ..... 2 feet.
21—Cymbal, IV ranks.. 1 foot.
22—Double Trumpet .. 16 feet.
23—Posaune ..... 8 feet.
24—Trumpet..... 8 feet.
25—Clarion ..... 4 feet.

Swell Organ, 20 Stops.

26—Bourdon..... 16 feet tone.
27—Open Diapason.... 8 feet.
28—Bell Gamba ..... 8 feet.
29—Echo Dulciana .... 8 feet.
30—Stopped Diapason .. 8 feet tone.
31—Stopped Quint..... $5\frac{2}{3}$ feet tone.
32—Principal..... 4 feet.
33—Gambette ..... 4 feet.
34—Flute..... 4 feet.
35—Twelfth..... $2\frac{2}{3}$ feet.
36—Fifteenth ..... 2 feet.
37—Octave Flute..... 2 feet.
38—Mixture, V ranks .. 2 feet.
39—Echo Dulciana Cornet, V ranks ..... 4 feet.
40—Double Bassoon.... 16 feet.
41—Hautboy ..... 8 feet.
42—Trumpet..... 8 feet.
43—Horn..... 8 feet.
44—Clarion ..... 4 feet.
45—Vox Humana ..... 8 feet tone.

Choir Organ, 15 Stops.

46—Bourdon	16 feet tone.	54—Flute	4 feet tone.
47—Open Diapason	8 feet.	55—Twelfth	$2\frac{2}{3}$ feet.
48—Stopped Diapason	8 feet tone.	56—Gemshorn	2 feet.
49—Clarinet Flute	8 feet tone.	57—Flageolet	2 feet.
50—Dulciana	8 feet.	58—Mixture, IV ranks	$1\frac{1}{3}$ foot.
51—Keraulophon	8 feet.	59—Corno de Bassetto	8 feet tone.
52—Spitzflote	4 feet.	60—Bassoon, throughout	8 feet.
53—Dulcet	4 feet.		

Solo Organ, 12 Stops.

61—Bourdon	16 feet tone.	67—Contra Fagotto	16 feet.
62—Diapason Harmonic	8 feet.	68—Clarinet	8 feet tone.
63—Stopped Diapason—metal	8 feet tone.	69—Hautboy	8 feet.
64—Flute Harmonic	4 feet.	70—Hautboy Clarion	4 feet.
65—Stopped Flute, metal	4 feet tone.	71—Tuba	8 feet.
66—Piccolo Harmonic	2 feet.	72—Tuba Clarion	4 feet.

Pedal Organ, 18 Stops.

73—Double Open Bass	32 feet.	82—Flute Bass	8 feet tone.
74—Sub-Bass	32 feet tone.	83—Twelfth Bass	$5\frac{1}{3}$ feet.
75—Open Bass, metal	16 feet.	84—Fifteenth Bass	4 feet.
76—Great Bass, wood	16 feet.	85—Mixture, VI ranks	$3\frac{1}{5}$ feet.
77—Dulciana Bass	16 feet.	86—Contra Posaune	32 feet.
78—Stopped Bass	16 feet tone.	87—Posaune	16 feet.
79—Great Quint Bass	$10\frac{2}{3}$ feet tone.	88—Bassoon	16 feet.
80—Principal Bass, metal	8 feet.	89—Trumpet	8 feet.
81—Octave Bass, wood	8 feet.	90—Clarion	4 feet.

Accessory Stops, Movements, &c.

1—Coupler Swell to Great.	8—Tremulant to Swell.
2—Choir to Great.	9—Pneumatic Lever attachment.
3—Solo to Great.	10, 11—Pedal Ventils.
4—Great to Pedal	12, 13, 14, 15—Four Composition Pedals to Great Organ.
5—Swell to Pedal.	
6—Choir to Pedal.	16, 17, 18—Three Ditto to Swell.
7—Solo to Pedal.	

Compass.

Manuals, CC to g^3 in altissimo, 56 notes. | Pedal, CCC to tenor f, 30 notes.

1268. It will be seen that the German custom referred to at page 202, sec. 886, namely, of attaching the word "Bass" to the Pedal Stops of double size to the Manual Stops of like kind, has been followed in all the preceding Specifications. This has been done, not only because it is the most simple system of nomenclature that has yet been devised, but also because it is the only system that appears to be likely to clear away the confusion that has so long existed in England as to the only correct manner of naming and classifying the Pedal Stops. It has frequently been

the case, that the 8-feet Pedal Stops have been classed as Diapasons instead of as Octaves; whereas the Pedal Stops are, in nearly every instance, twice the length of the similarly labelled Manual Stops. Exceptions to this rule, however, are presented by the Trumpet and Clarion, which are 8 and 4 feet Stops respectively, whether placed on the Manual or Pedal.

1269. There are several excellent Stops in German Organs that are not at present made in England, for which reason their names have not been included in the foregoing Specifications. They will, however, be readily traced in the plans of Foreign Organs that will now be given in the form of an Appendix. An examination of these schemes, and a comparison of different Specifications comprising the same number of Stops, with the view of ascertaining their point of difference, will be found not only a very interesting, but also a very instructive employment.

APPENDIX,

CONTAINING

AN ACCOUNT OF FOREIGN AND BRITISH ORGANS.

1. Haarlem.

The Organ in the Cathedral Church of St. Bavon, in this city, has long been celebrated in the annals of Organ-building as one of the largest, as well as one of the finest instruments in the world. It was built by Christian Muller, of Amsterdam, and was nearly three years and a half in course of construction; it having been commenced on the 28rd of April, 1735, and finished on the 13th of September, 1738. The Haarlem Organ has 60 sounding Stops, among which are two of 32 feet, and eight of 16 feet; and all the Stops are whole ones, excepting the Cornets, and the Hautboy in the Great Organ. Many of the Stops, farther, have two Pipes to each key in the Treble. This is the case with the Prestant of 16 feet (Double Open Diapason), which not only extends throughout the entire range of the Great Manual, but has duplication Pipes from the middle b key (Gamut B Pipe) upwards. The Octave, of 8 feet (Open Diapason), also has two Pipes to a note, commencing on the same key. The Prestant of 8 feet (Open Diapason), on the Choir Manual, similarly has two Pipes to every note, commencing as low down in the scale as Gamut G; and the corresponding Stop (Prestant) in the Echo also has double Pipes, beginning at middle b. The ranks of Mixture likewise increase in number as the scale ascends. All the Stops are made of metal, excepting the Pedal Sub-Bass, which is of wood, and is a subsequent insertion. The front Pipes, which include the Pedal "Sub-Principal" of 32 feet, are of pure English tin, burnished; and all the interior metal Pipes are formed of a composition consisting of half tin and half lead. The 32-feet Pipe, which is 15 inches in diameter and nearly 40 feet long, stands in one of the chief towers. The instrument, with its magnificent case, altogether cost about £10,000. The following is a list of its Stops:

Great, 16 Stops, 1209 Pipes.

	Pipes.		Pipes.
1—Prestant.....16 feet.....	78	9—Quint prestant..2⅔ feet.....	51
2—Bourdon.....16 feet tone..	51	10—Woud-fluit.... 2 feet.....	51
3—Octaav..... 8 feet.....	78	11—Tertian, II ranks.1⅗ feet....	.102
4—Roerfluit..... 8 feet tone..	51	12—Mixtur, VI, VIII, and X ranks	.339
5—Viol di Gamba.. 8 feet.....	51	13—Trompet.....16 feet.....	51
6—Roer-quint....5⅓ feet tone..	51	14—Trompet..... 8 feet.....	51
7—Octaav..... 4 feet.....	51	15—Hautbois..... 8 feet.....	51
8—Gemshorn..... 4 feet.....	51	16—Trompet..... 4 feet.....	51

Choir, in front, 14 Stops, 1268 Pipes.

17—Prestant..... 8 feet.....	95	24—Sesquialtera, II, III, and IV ranks.....	144
18—Quintadena.... 8 feet tone..	51	25—Mixtur, VI, VII & VIII ranks	.360
19—Holfluit..... 8 feet.....	51	26—Cimbel, II ranks.....	102
20—Octaav..... 4 feet.....	51	27—Cornet, V ranks.....	108
21—Fluit-doux..... 4 feet.....	51	28—Fagot.....16 feet.....	51
22—Speel-fluit....2⅔ feet.....	51	29—Trompet..... 8 feet.....	51
23—Super-octaav... 2 feet.....	51	30—Regal..... 8 feet. ...	51

Echo, 15 Stops, 1,098 Pipes.

	Pipes.		Pipes.
31—Quintadena....16 feet tone..	51	39—Flageolet.....1⅓ feet.....	51
32—Prestant..... 8 feet.....	81	40—Sexquialter, II ranks.....	102
33—Baar-pyp..... 8 feet.....	51	41—Mixtur, IV, V, and VI ranks..	246
34—Quintadena.... 8 feet tone..	51	42—Cimbel, IV ranks.....	108
35—Octaav..... 4 feet.....	51	43—Schalmei..... 8 feet.....	51
36—Flag-fluit..... 4 feet.....	51	44—Dulcian..... 8 feet.....	51
37—Nassat..... .2⅔ feet.....	51	45—Vox Humana.. 8 feet.....	51
38—Nacht-horn.... 2 feet.....	51		

Pedal, 15 Stops, 513 Pipes.

46—Sub-Principal ..32 feet.....	27	54—Holfluit..... 2 feet.....	27
47—Prestant.....16 feet.....	27	55—Ruis-quint, V ranks.....2⅔ feet.....	27
48—Sub-bass.....16 feet.....	27	56—Buzain..... .32 feet.....	27
49—Roer-quint....10⅔ feet tone.	27	57—Buzain..... .16 feet.....	27
50—Octaav..... 8 feet.....	27	58—Trompet..... 8 feet.....	27
51—Holfluit..... 8 feet.....	27	59—Trompet..... 4 feet.....	27
52—Quint.....5⅓ feet.....	27	60—Cinq..... 2 feet.....	27
53—Octaav..... 4 feet.....	27		

Accessory Stops, Movements, &c.

1—Coupler, Choir to Great.
2—Coupler, Echo to Great.
3, 4—Two Tremulants.
5—Wind to Great Organ.
6—Wind to Choir Organ.
7—Wind to Echo Organ.
8—Wind to Pedal Organ.
Twelve Bellows, 9 feet by 5.

Compass.

Manuals, CC to d^3 in alt. 51 notes.
Pedals, CCC to tenor d, 27 notes.

Number of Pipes.

Great.....	1209
Choir.....	1268
Echo.....	1098
Pedal.....	513
Total.....	4088

2. Rotterdam.

The Organ in the Cathedral Church of St. Lawrence, situated at the upper part of Rotterdam, is a very fine and powerful Instrument, and will, when completed, be one of the largest in the world. It already contains 76 Stops, and is designed to have 92. Its Pipes at present amount in number to about 5,700, the largest of which, standing in front, measures 32 feet speaking length, and 16 inches in diameter. Among the Stops are included 3 of 32 feet, and 12 of 16 feet. The distribution of its Stops is as follows:

Great, 18 Stops.

1—Prestant.....	16 feet.	10—Octave.....	2 feet.
2—Bourdon.....	16 feet tone.	11—Woud-flute.....	2 feet.
3—Octave.....	8 feet.	12—Sesquialtera, II ranks	2⅔ feet.
4—Prestant.....	8 feet.	13—Mixtur, IV, V, and VI ranks.	
5—Holpfeif.....	8 feet.	14—Scharf, IV and V ranks.	
6—Quint.....	5⅓ feet.	15—Cornet, VI ranks.	
7—Octave.....	4 feet.	16—Trompete.....	16 feet.
8—Speelflute.....	4 feet.	17—Dulcian.....	16 feet.
9—Quint.....	2⅔ feet.	18—Trompete.....	8 feet.

Positif, 18 Stops.

19—Bourdon	16 feet tone.	28—Octave	2 feet.
20—Prestant	8 feet.	29—Gemshorn	2 feet.
21—Roerflote	8 feet tone.	30—Mixtur, VI and VII ranks.	
22—FluteTraverse,discant	8 feet.	31—Mixtur, IV and V ranks.	
23—Dolce	8 feet.	32—Cornet, VI ranks.	
24—Octave	4 feet.	33—Fagotto	16 feet.
25—Roerflote	4 feet tone.	34—Trompete	8 feet.
26—Gemshorn	4 feet.	35—Oboe	8 feet.
27—Sesquialtera, II ranks	$2\frac{2}{3}$ feet.	36—Fagotto	8 feet.

Choir, 15 Stops.

37—Quintadena	16 feet tone.	45—Octave	2 feet.
38—Prestant	8 feet.	46—Flute	2 feet.
39—Quintadena	8 feet tone.	47—Flageolet	1 foot.
40—Gamba	8 feet.	48—Cornet, III ranks.	
41—Holpfeif	8 feet.	49—Vox Humana	8 feet tone.
42—Octave	4 feet.	50—Schalmay	8 feet.
43—Open Flute	4 feet.	51—Carillon, III ranks.	
44—Roerflote	4 feet tone.		

Echo, 8 Stops.

52—Bourdon	8 feet tone.	56—Vox Angelica	8 feet.
53—Salcional	8 feet.	57—Salcional	4 feet.
54—Barpfeif	8 feet.	58—Fluit	4 feet.
55—Gamba	8 feet.	59—Gemshorn	2 feet.

Pedal, 16 Stops.

60—Prestant	32 feet.	68—Octave	8 feet.
61—Sub-bass	32 feet tone.	69—Octave	4 feet.
62—Prestant	16 feet.	70—Octave	2 feet.
63—Sub-bass	16 feet tone.	71—Buzain	32 feet.
64—Bourdon	16 feet tone.	72—Buzain	16 feet.
65—Prestant	16 feet.	73—Trombone	8 feet.
66—Quint	$10\frac{2}{3}$ feet.	74—Trompete	4 feet.
67—Prestant	8 feet.	75—Cincq	2 feet.

Accessory Stops, Movements, &c.

1—Coupler, Echo to Choir.	5, 6—Two Tremulants.
2—Coupler, Choir to Great.	7, 8, 9, 10, 11—Five Wind-trunk valves.
3—Coupler, Positif to Great.	
4—Coupler, Great to Pedal.	

Compass.

Manuals, CC to f^3 in alt. 54 notes.	Pedal, CCC to tenor f, 30 notes.

3. Rotterdam.

The Organ in the Octagon Church at Rotterdam was built by Batz, of Utrecht, in 1850, and is a very fine Instrument. It has 3 Manuals and Pedal of 8 Stops, and is one of the very few German Organs which have a Swell and Composition Pedals. The following is an enumeration of its Stops, &c.

Great, 13 Stops.

1—Prestant	16 feet.	8—Octaaf	2 feet.
2—Octaaf	8 feet.	9—Mixtur, VIII ranks.	
3—Gemshorn	8 feet.	10—Cornet, V ranks.	
4—Bourdon	8 feet tone.	11—Fagot	1 feet.
5—Octaaf	4 feet.	12—Trompet	8 feet.
6—Fluit	4 feet.	13—Clarinet	4 feet.
7—Quint	$2\frac{2}{3}$ feet.		

Choir, 11 Stops.

14—Bourdon	16 feet tone.	20—Nazard	$2\frac{2}{3}$ feet.
15—Prestant	8 feet.	21—Woudfluit	2 feet.
16—Viola da Gamba	8 feet.	22—Cornet, V ranks.	
17—Rohrfluit	8 feet tone.	23—Trompet	8 feet.
18—Octaaf	4 feet.	24—Dulcian	8 feet.
19—Open-fluit	4 feet.		

Swell, 8 Stops.

25—Gamba	8 feet.	29—Rohrfluit	4 feet tone.
26—Salicional	8 feet.	30—Gemshorn	2 feet.
27—Holpyp	8 feet.	31—Schalmey	8 feet.
28—Salicional	4 feet.	32—Vox Humana	8 feet.

Pedal, 8 Stops.

33—Prestant	16 feet.	37—Octaaf	4 feet.
34—Sub-bass	16 feet tone.	38—Buzain	16 feet.
35—Octaaf	8 feet.	39—Trombone	8 feet.
36—Fluit-bass	8 feet.	40—Trompet	4 feet.

Accessory Stops, Movements, &c.

1—Swell to Choir.	5—Octave Pedal.
2—Choir to Great.	6, 7, 8, 9—Four Wind-trunk Valves.
3—Tremulant Swell.	10, 11, 12—Three Composition Pedals.
4—Great to Pedal.	

Compass.

Manuals, CC to f^3 in alt. 54 notes.	Pedal, CCC to tenor f, 30 notes.

4. Amsterdam.

The Organ in the Old Church at Amsterdam was begun in 1725. It is a most effective Instrument; all the Foundation Stops are *doubled*, which increases the fulness and solidity of the tone. The Reed Stops and Mixtures are also very good, and the mechanism is very fair for so old an Organ. This Instrument contains 51 Stops, distributed as follows:

Great, 16 Stops.

1—Prestant	16 feet.	9—Octaaf	2 feet.
2—Bourdon	16 feet tone.	10—Fluit	2 feet.
3—Octaaf	8 feet.	11—Flageolet	1 foot.
4—Holpyp	8 feet.	12—Sesquialtera, IV ranks	$2\frac{2}{3}$ feet.
5—Quint	$5\frac{1}{3}$ feet.	13—Mixtur, VI, VII, and VIII ranks.	
6—Octaaf	4 feet.	14—Scherp, VI ranks.	
7—Roerfluit	4 feet tone.	15—Trompet	16 feet.
8—Roerquint	$2\frac{2}{3}$ feet tone.	16—Trompet	8 feet.

Choir, 12 Stops.

17—Prestant	8 feet.	23—Quint	$2\frac{2}{3}$ feet.
18—Gedact	8 feet tone.	24—Octaaf	2 feet.
19—Quintaton	8 feet tone.	25—Sesquialtera, IV ranks	$2\frac{2}{3}$ feet.
20—Dulciana	2 feet.	26—Mixtur, VII and VIII ranks.	
21—Octaaf	4 feet.	27—Scherp, VI ranks.	
22—Fluit	4 feet.	28—Trompete	8 feet.

Echo, 13 Stops.

29—Quintadeen	16 feet tone.	36—Superoctaaf	2 feet.
30—Prestant	8 feet.	37—Sesquialtera, III ranks	$2\frac{2}{3}$ feet.
31—Baarpyp	8 feet.	38—Cymbal, III ranks.	
32—Gamba	8 feet.	39—Fagotto	16 feet.
33—Octaaf	4 feet.	40—Trompet	8 feet.
34—Gemshorn	4 feet.	41—Vox Humana	8 feet.
35—Nasat	$2\frac{2}{3}$ feet.		

Pedal, 10 Stops.

42—Prestant	16 feet.	47—Nachthorn	2 feet.
43—Sub-bass	16 feet tone.	48—Buzain	16 feet.
44—Octaaf	8 feet.	49—Trompet	8 feet.
45—Roerquint	$5\frac{1}{3}$ feet tone.	50—Trompet	4 feet.
46—Octaaf	4 feet.	51—Cornetin	2 feet.

Accessory Stops, Movements, &c.

Coupler, Echo to Great.	Coupler, Great to Pedal.
Coupler, Choir to Great.	Tremulant Echo.

Compass.

Manuals, CC to d^3 in alt.	Pedal, CCC to tenor d.

5. Amsterdam.

The Organ in the New Church at Amsterdam is also a very old one, like the last. The original builder's name is unknown; but it was repaired and enlarged in 1673 by J. Duyschor van Goor, of Dordrecht. It is a most excellent Instrument, though scarcely equal to that in the Old Church. The Mixtures, however, are very brilliant, and the Reeds are very well voiced. It has 44 Stops, of which the following is a list:

Great, 12 Stops.

1—Prestant	16 feet.	7—Quint	$2\frac{2}{3}$ feet.
2—Quintadena	16 feet tone.	8—Siflet	2 feet.
3—Octaaf	8 feet.	9—Mixtur, VI ranks.	
4—Holpyp	8 feet.	10—Scherp, VII ranks.	
5—Octaaf	4 feet.	11—Fagot	16 feet.
6—Gemshorn	4 feet.	12—Trompet	8 feet.

Choir, 14 Stops.

13—Prestant	8 feet.	20—Fluit	2 feet.
14—Holpyp	8 feet.	21—Siflet	1 foot.
15—Quintadena	8 feet tone.	22—Sesquialtera, II ranks	$2\frac{2}{3}$ feet.
16—Octaaf	8 feet.	23—Mixtur, III ranks.	
17—Fluit	4 feet.	24—Scherp, VI ranks.	
18—Quint-fluit	$2\frac{2}{3}$ feet.	25—Quartane, IV ranks.	
19—Octaaf	2 feet.	26—Cornet, V ranks.	

Echo, 10 Stops.

27—Prestant	8 feet.	32—Fluit	4 feet.
28—Quintadena	8 feet tone.	33—Octaaf	2 feet.
29—Baarpyp	8 feet.	34—Sesquialtera	$2\frac{2}{3}$ feet.
30—Gamba	8 feet.	35—Trompet	8 feet.
31—Octaaf	4 feet.	36—Vox Humana	8 feet.

Pedal, 8 Stops.

37—Prestant	16 feet.	41—Octaaf	4 feet.
38—Bourdon	16 feet tone.	42—Buzain	16 feet.
39—Octaaf	8 feet.	43—Trompet	8 feet.
40—Roerquint	$5\frac{1}{3}$ feet tone.	44—Trompet	4 feet.

Accessory Stops, Movements, &c.

1—Coupler, Echo to Great.	4—Tremulant Echo.
2—Coupler, Choir to Great.	5—Tremulant Choir.
3—Coupler, Great to Pedal.	6, 7, 8, 9—Four Wind-trunk Valves.

Compass.

Manuals, CC to d^3 in alt. 51 notes.	Pedal, CCC to tenor d, 27 notes.

6. Nymengen.

The Organ in the Church of St. Stephen, at Nymengen, in Holland, was built in 1766, by Kōnig, of Cologne. It is a much larger as well as more complete Instrument than any which König built for his own city. It contains altogether 53 Stops, 3 Manuals, and Pedal; the latter comprising 12 Stops. The following is the Specification of the above-named Instrument, which is one of the best in Holland, particularly in regard to its Solo Stops:

Great Organ, 13 Stops.

1—Prestant	16 feet.	8—Tertiaan	$3\frac{1}{5}$ feet.
2—Octaaf	8 feet.	9—Super-octaaf	2 feet.
3—Gemshorn	8 feet.	10—Mixtur, VI ranks.	
4—Roer-gedact	8 feet tone.	11—Fourniture, III ranks.	
5—Quint-gedact	$5\frac{1}{3}$ feet tone.	12—Trompete Discant / Trompete Bass	16 feet.
6—Octaaf	4 feet.		
7—Roerflote	4 feet tone.	13—Trompete	8 feet.

Choir, 14 Stops.

14—Bourdon	16 feet tone.	21—Klein octave	2 feet.
15—Prestant	8 feet.	22—Flageolet	1 foot.
16—Flauto Traverso	8 feet.	23—Mixtur, VI ranks.	
17—Klein Bourdon	8 feet tone.	24—Carillon, II ranks.	
18—Octaaf	4 feet.	25—Trompete	8 feet.
19—Flaut a becq	4 feet.	26—Bassoon	8 feet.
20—Quint	$2\frac{2}{3}$ feet.	27—Vox Humana	8 feet tone.

Echo, 14 Stops.

28—Quintadeen	16 feet tone.	35—Quint Flute	$1\frac{1}{3}$ feet.
29—Koppel	8 feet.	36—Mixtur, V ranks.	
30—Viola di Gamba	8 feet.	37—Cornet, V ranks.	
31—Weide Gedact	8 feet tone.	38—Echo, II ranks	8 & 4 feet.
32—Octaaf	4 feet.	39—Hautbois	8 feet.
33—Nazard and composita, II ranks	$2\frac{2}{3}$ feet.	40—Vox Humana	8 feet tone.
		41—Vox Angelica Bass	4 feet.
34—Super-octave	2 feet.		

Pedal, 12 Stops.

42—Principal	16 feet.	48—Quint	$5\frac{1}{3}$ feet.
43—Violon	16 feet.	49—Octaaf	4 feet.
44—Sub-bass	16 feet tone.	50—Bombarde	16 feet.
45—Quint-bass	$10\frac{2}{3}$ feet tone.	51—Trompete	8 feet.
46—Octaaf	8 feet.	52—Clairon	4 feet.
47—Roer-bass	8 feet tone.	53—Cornet-bass	2 feet.

Accessory Stops, Movements, &c.

1—Great to Pedal.
2—Choir to Great.
3—Echo to Great.
4—Tremulant to Choir.
5, 6, 7, 8—Four Wind-trunk Valves.

Compass.

Manuals, CC to f^3 in alt. 54 notes. | Pedal, CCC to tenor d, 27 notes.

7. Gouda.

The Organ in the Church of St. John the Baptist, at Gouda, was built by Moreau, in 1736. One of the chief features in this Instrument is its Vox Humana Stop, which is particularly fine; but the tone of the whole Organ is most excellent. It has 3 Manuals and Pedal, and 51 Stops, the names and distribution of which are as follow:

Great, 13 Stops.

1—Prestant	16 feet.	8—Octaaf	2 feet.
2—Prestant	8 feet.	9—Mixtur, IV and VI ranks.	
3—Holpyp	8 feet.	10—Cornet, V ranks.	
4—Quint	$5\frac{1}{3}$ feet.	11—Trompet	16 feet.
5—Octaaf	4 feet.	12—Trompet	8 feet.
6—Roorfluit	4 feet tone.	13—Schalmey	8 feet tone.
7—Open-fluit	4 feet.		

Choir, 15 Stops.

14—Bourdon	16 feet tone.	22—Woud-fluit	2 feet.
15—Prestant	8 feet.	23—Mixtur, VI ranks.	
16—Holpyp	8 feet.	24—Scherp, VI ranks.	
17—Fluit-traverso	8 feet.	25—Cornet, VI ranks.	
18—Octaaf	4 feet.	26—{ Carillon discant, III ranks. Carillon bass, II ranks.	
19—Fluit-douce	4 feet.		
20—Quint	$2\frac{2}{3}$ feet.	27—Trompet	8 feet.
21—Octaaf	2 feet.	28—Dulciaan	8 feet.

Echo, 12 Stops.

29—Prestant	8 feet.	35—Octaaf	2 feet.
30—Salicional	8 feet.	36—Nacht-hoorn	2 feet.
31—Echo Holpyp	8 feet.	37—Sesquialtera, II ranks	$2\frac{2}{3}$ feet.
32—Quintadeen	8 feet tone.	38—Flageolet	1 foot.
33—Octaaf	4 feet.	39—Echo Trompet	8 feet.
34—Echo Fluit	4 feet.	40—Vox Humana	8 feet tone.

Pedal, 11 Stops.

41—Prestant	16 feet.	47—Holfluit	2 feet.
42—Sub-bass	16 feet tone.	48—Buzain	16 feet.
43—Prestant	8 feet.	49—Trompet	8 feet.
44—Wyd-gedact	8 feet tone.	50—Clairon	3 feet.
45—Roor-quint	$5\frac{1}{3}$ feet tone.	51—Cornetin	2 feet.
46—Octaaf	4 feet.		

Accessory Stops, Movements, &c.

1—Great to Pedal.
2—Choir to Great.
3—Echo to Great.
4—Tremulant Echo.
5, 6, 7, 8—Four Wind-trunk Valves.

Compass.

Manuals, CC to d^3 in alt. 51 notes. | CCC to tenor c, 25 notes.

8. The Hague.

The Organ in the Lutheran Church at the Hague is a very good Instrument, possessing 3 Manuals and Pedal, and 39 Stops, the names and distribution of which latter are as follow:

Great, 14 Stops.

1—Bourdon	16 feet tone.	8—Octaaf	2 feet.
2—Prestant	8 feet.	9—Woudefluit	2 feet.
3—Roorfluit	8 feet tone.	10—Mixtuur, VI ranks.	
4—Quintadon	8 feet tone.	11—Cornet, V ranks.	
5—Octaaf	4 feet.	12—Fagot	16 feet.
6—Nachthoorn	4 feet.	13—Trompet	8 feet.
7—Quint	$2\frac{2}{3}$ feet.	14—Trompet	4 feet.

Choir, 9 Stops.

15—Prestant	8 feet.	20—Sesquialtera, II ranks	$2\frac{2}{3}$ feet.
16—Holpyp	8 feet.	21—Flageolet	1 foot.
17—Octaaf	4 feet.	22—Mixtuur, III ranks.	2 feet.
18—Fluit	4 feet.	23—Dulciana	8 feet.
19—Octaaf	2 feet.		

Echo, 8 Stops.

24—Prestant	8 feet.	28—Roorfluit	4 feet tone.
25—Baarpyp	8 feet.	29—Fluit	2 feet.
26—Quintadon	8 feet tone.	30—Schalmey	8 feet tone.
27—Salicional	4 feet.	31—Vox Humana	8 feet tone.

Pedal.

32—Prestant	16 feet.	36—Octaaf	4 feet.
33—Bourdon	16 feet tone.	37—Trompet	16 feet.
34—Prestant	8 feet.	38—Trompet	8 feet.
35—Roor-quint	$5\frac{1}{3}$ feet tone.	39—Trompet	4 feet.

Accessory Stops, Movements, &c.

1—Choir to Great.
2—Echo to Great.
3—Great to Pedal.
4—Tremulant Echo.
5—Tremulant Choir.
6, 7, 8, 9—Fuur Wind-trunk Valves.

Compass.

CC to c^3 in altissimo, 49 notes. | Pedal CCC to Tenor c, 25 notes.

9. Delft.

The Organ in the new Church at Delft was built by Batz, of Utrecht, and is altogether a very fine Organ, especially the Reed Stops. It has 3 Manuals and Pedal, and 43 Stops, of which latter the following is a list:

Great, 13 Stops.

1—Prestant	16 feet.	8—Octaaf	2 feet.
2—Bourdon	16 feet tone.	9—Mixtuur, IV, VI, & VIII ranks.	
3—Octaaf	8 feet.	10—Cornet, V ranks.	
4—Roorflote	8 feet tone.	11—Fagot	16 feet.
5—Octaaf	4 feet.	12—Trompet	8 feet.
6—Gemshoorn	4 feet.	13—Trompet	4 feet.
7—Quint	$2\frac{2}{3}$ feet.		

Choir, 11 Stops.

14—Prestant	8 feet.	20—Octaaf	2 feet.
15—Holpyp	8 feet.	21—Mixture, III, IV, & VI ranks.	
16—Quintadon	8 feet tone.	22—Cornet, IV ranks.	
17—Octaaf	4 feet.	23—Trompet	8 feet.
18—Roorfluit	4 feet tone.	24—Dulcian	8 feet.
19—Quint	$2\frac{2}{3}$ feet.		

Echo, 9 Stops.

25—Prestant	8 feet.	30—Salicional	4 feet.
26—Holpyp	8 feet.	31—Woudefluit	2 feet.
27—Viol de Gamba	8 feet.	32—Trompet	8 feet.
28—Quintadena	8 feet tone.	33—Vox Humana	8 feet tone.
29—Open-fluit	4 feet.		

Pedal, 10 Stops.

34—Prestant	16 feet.	39—Octaaf	4 feet.
35—Sub-bass	16 feet tone.	40—Bazuin	16 feet.
36—Octaaf	8 feet.	41—Trompet	8 feet.
37—Fluit-bass	8 feet.	42—Trompet	4 feet.
38—Roor-quint	$5\frac{1}{3}$ feet tone.	43—Cincq	2 feet.

Accessory Stops, Movements, &c.

1—Echo to Great.	4—Tremulant.
2—Choir to Great.	5, 6, 7, 8—Four Wind-trunk Valves.
3—Great to Pedal.	

Campass.

Manuals, CC to f^3 in altissimo, 54 notes. | Pedals, CCC to Tenor e, 29 notes.

10. Utrecht.

The Organ in the principal Protestant Church at Utrecht is a very fine one, and is remarkable for having two Pipes to each key from Middle c upwards, throughout all the Stops of the Great Organ. It was built by Batz, of Utrecht, in 1826, and contains 51 Stops, 3 Manuals, and Pedal. The following is a list of its contents:

Great, 13 Stops.

1—Prestant	16 feet.	7—Quint	$2\frac{2}{3}$ feet.
2—Bourdon, Metal Treble, Wood Bass	16 feet tone.	8—Octaaf	2 feet.
3—Octaaf	8 feet.	9—Gemshorn	2 feet.
4—Roerfluit	8 feet tone.	10—Sesquialtera, IV ranks.	
5—Octaaf	4 feet.	11—Mixture .. VII ranks.	
6—Gemshorn	4 feet.	12—Fagott	16 feet.
		13—Trompet	8 feet.

Choir, 13 Stops.

14—Prestant, 2 Pipes all through	8 feet.	20—Octaaf	2 feet.
15—Holpyp	8 feet.	21—Fluit	2 feet.
16—Quintadena	8 feet.	22—Mixture..V ranks.	
17—Octaaf	4 feet.	23—Scharf, VIII ranks.	
18—Roerfluit	4 feet tone.	24—Cornet, V ranks.	
19—Quint	$2\frac{2}{3}$ feet.	25—Trompet	8 feet.
		26—Dulcian	8 feet.

Echo, 13 Stops.

27—Prestant	8 feet.	33—Flute, open, large	4 feet.
28—Bourdon	8 feet tone.	34—Quint Fluit	$2\frac{2}{3}$ feet.
29—Gamba	8 feet.	35—Woud-Fluit	2 feet.
30—Flute traversie to Tenor c	8 feet.	36—Flageolet	1 foot.
31—Barpyf	8 feet.	37—Trompet	8 feet.
32—Octaaf	4 feet.	38—Vox Humaine	8 feet.
		39—Carillon .. II ranks.	

Pedal, 12 Stops.

40—Prestant, of metal, in front	16 feet.	46—Mixture, VI ranks..	$2\frac{2}{3}$ feet.
41—Sub-bass, of wood..	16 feet tone.	47—Bazuin, CCC, 10 inch.	16 feet.
42—Octaaf, of metal....	8 feet.	48—Trombone	8 feet.
43—Fluit-Bass	8 feet tone.	49—Trompet	4 feet.
44—Roer-quint	$5\frac{1}{3}$ feet tone.	50—Cinq	2 feet.
45—Octaaf, of metal....	4 feet.	51—Clairon	1 foot.

Accessory Stops, Movements, &c.

1—Positif to Great.	4—Tremblant Positif.
2—Echo to Great.	5, 6, 7, 8—Four Wind-trunk Valves.
3—Great to Pedals.	

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to Tenor d, 27 notes.

11. Triebel.

The Organ in the State Church at Triebel, in the Netherlands, has 22 Sounding Stops, 2 Manuals, and Pedal. The following is a list of the Stops:

Great, 10 Stops.

1—Bourdon, 10 loth metal in the treble; the bass of wood,	16 feet tone.	5—Octave, 12 loth English tin	4 feet.
2—Principal, 14 loth tin, polished, and in front,	8 feet.	6—Fullflote, 10 loth metal	4 feet.
3—Salicional, 14 loth English tin	8 feet.	7—Quinte, 12 loth tin..	$2\frac{2}{3}$ feet.
4—Hohlflote, 10 loth metal to tenor c; the 8-feet octave of wood	8 feet.	8—Super-octave, 12 loth tin	2 feet.
		9—Mixture, IV ranks ..	2 feet.
		10—Trompete	8 feet.

Choir, 8 Stops.

11—Viola di Gamba, 14 loth English tin	8 feet.	15—Wald-flote, 10 loth English tin	2 feet.
12—Flaut d'amour	8 feet.	16—Flageolet, 12 loth Eng. tin,	2 feet.
13—Principal, 14 loth English tin, in front,	4 feet.	17—Cornet, 12 loth English tin, III ranks.	
14—Nasard, 12 loth Eng. tin	$2\frac{2}{3}$ feet.	18 {Oboe, 12 loth Eng. tin / Fagot, 12 loth Eng. tin}	8 feet.

Pedal, 4 Stops.

19—Principal, 14 loth Eng. tin, in front; the five lowest Pipes of Pine, and Stopped..... 16 feet.
20—Subbass, wood .... 16 feet tone.
21—Octave, wood ..... 8 feet.
22—Posaune ..... 16 feet.

Accessory Stops, Movements, &c.

1—Choir to Great.
2—Great to Pedal.
3, 4, 5—Three Wind-trunk Valves. Three Bellows, 10 feet long. Six Sound-boards.

Compass.

Manuals, CC to f^3 in alt, 54 notes. | Pedal, CCC to Tenor d, 27 notes.

12. St. Denis.

The Organ in the Abbey Church of St. Denis, near Paris—the Westminster Abbey of France,—is a particularly fine instrument. It was made by MM. Cavaillé Coll, Organ-builders of Paris, and was opened on the 21st of September, 1841. It contains 69 Sounding Stops, among which are 12 for the Pedal; and there are 3 Manuals. The "Clavier de Bourbordes" is not furnished with a separate Manual, as at the Madelaine, which is to be regretted, but communicates with the Great Organ keys. Among the most remarkable features in this Organ is the adjustment of the wind. Not only are the Reed Stops placed on a heavier wind than those of the Flue species, but the upper octaves of all the Stops are in common supplied with a stronger blast than the lower; upon the principle that wind instrument players exercise a greater pressure of the muscles upon the lungs when producing the acute sounds. There are also several Stops of a novel kind, called by Cavaillé "Harmonique," which sound the octave above the note that the length of the Pipe would indicate. The Organ has also the Pneumatic Lever attachment for lightening the touch, and 8 Composition Pedals of novel and convenient construction. The following is a list of its Stops:

Clavier du Grand Orgue, 20 Stops.

	Pipes.		Pipes.
1—Montre, throughout; of spotted metal to CCC; last octave of wood	32	11—Doublette	2 feet. 54
2—Montre	16	12—Grosse Fourniture, IV ranks	216
3—Bourdon	16 feet tone. 54	13—Grosse Cymbale, IV ranks	216
4—Montre	8 feet. 54	14—Petit Fourniture, IV ranks	216
5—Bourdon	8 feet tone. 54	15—Petit Cymbale, IV ranks	216
6—Viole	8 feet. 54	16—Première Trompette harmonique	8 feet. 54
7—Flute traversiere harmonique	8 feet. 54	17—DeuxièmeTrompette harmonique	8 feet. 54
8—Prestant	4 feet. 54	18—Basson et cor anglais	8 feet. 54
9—Flute octaviante harmonique	4 feet. 54	19—Cornet à pavillon	8 feet. 54
10—Nasard	$2\frac{2}{3}$ feet. 54	20—Clairon octaviant	4 feet.

Clavier des Bombardes, 12 Stops.

		Pipes.			Pipes.
21—Bourdon	16 feet tone	54	29—Trompette de Bombarde	8 feet	54
22—Flute	8 feet	54	30—Trompette harmonique	8 feet	54
23—Bourdon	8 feet tone	54	31—Clairon harmonique	4 feet	54
24—Prestant	4 feet	54	32—Clairon octaviant	4 feet	54
25—Quint	$2\frac{2}{3}$ feet	54			
26—Doublette	2 feet	54			
27—Cornet, VII ranks		210			
28—Bombarde	16 feet	54			

Clavier de Recit.-echo expressif, 8 Stops.

33—Bourdon	8 feet tone	54	38—Trompette harmonique	8 feet	54
34—Flute harmonique	8 feet	54	39—Voix Humaine, harmonique	8 feet	54
35—Flute octaviant harmonique	4 feet	54	40—Clairon harmonique	4 feet	54
36—Quint	$2\frac{2}{3}$ feet	54			
37—Octavin harmonique	2 feet	54			

Clavier du Positif, 17 Stops.

41—Bourdon	16 feet tone	54	51—Tierce	$1\frac{3}{5}$	54
42—Salcional	8 feet	54	52—Cymbale, IV ranks		216
43—Flute harmonique	8 feet	54	53—Fourniture, IV ranks		216
44—Bourdon	8 feet tone	54	54—Trompette harmonique	8 feet	54
45—Prestant	4 feet	54	55—Clairon octaviant	4 feet	54
46—Flute	4 feet	54	56—Cor d'harmonie et Hautbois	8 feet	54
47—Flute octaviante	4 feet	54	57—Cromorne	8 feet	54
48—Quint	$2\frac{2}{3}$ feet	54			
49—Doublette	2 feet	54			
50—Flageolet harmonique	2 feet	54			

Clavier de Pedales, 12 Stops.

58—Flute ouverte	32 feet	25	65—Premiere Trompette (12 ft.)	8 feet	25
59—Flute ouverte (24 ft.)	16 feet	25	66—Deuxieme Trompette (12 ft.)	8 feet	25
60—Basse-contre (24 ft.)	16 feet	25	67—Bason (12 ft.)	8 feet	25
61—Flute ouverte (12 ft.)	8 feet	25	68—Premiere Clairon (6 ft.)	4 feet	25
62—Grosse-quint (8 ft.)	$5\frac{1}{3}$ feet	25	69—Deuxieme Clairon (6 ft.)	4 feet	25
63—Flute ouverte (6 ft.)	4 feet	25			
64—Bombarde (24 ft.)	16 feet	25			

Combination Pedals, &c.

1—Recit. (Swell) to Great.
2—Bombardes to Great Manual.
3—Swell Stops.
4—Positif to Great.
5—The Treble of Positif Reed and Harmonic Stops to Foundation Stops.
6—The Bass of ditto to ditto.
7—Manuals, Basses to Pedal.
8—Sub-octave Manual.
9—Tremulant Swell.

Compass.

Manuals, CC to f_3 in alt, 54 notes. | Pedal, FFF to tenor f, 25 notes.

Barker's Pneumatic lever was first used in this Organ.

12 A. St. Vincent de Paul, Paris.

The Organ in the Church of St. Vincent de Paul, at Paris, was built by Cavaillé Coll, and is quite on an equality with the same builder's admirable instrument at the Madelaine, both in regard to refinement of tone and perfectness of finish in the mechanism. It stands at the west end of the Church, and is divided, so as not to obstruct the light through the west window. The Stops are 40 in number, of which the following is a list:

Great Organ, 14 Stops.

1—Montre	16 feet.	8—Quinte	$2\frac{2}{3}$ feet.
2—Bourdon	16 feet tone.	9—Doublette	2 feet.
3—Montre	8 feet.	10—Fourniture, V ranks	
4—Gamba	8 feet.	11—Cymballe, III ranks	
5—Bourdon	8 feet tone.	12—Trompette	8 feet.
6—Prestant	4 feet.	13—Cornet à pavillon	8 feet.
7—Flute	4 feet.	14—Clairon	4 feet.

Choir Organ, 10 Stops.

15—Bourdon	16 feet tone.	20—Flute octaviante	4 feet.
16—Flute harmonique	8 feet.	21—Doublette	2 feet.
17—Salicional	8 feet.	22—Octavin harmonique	2 feet.
18—Bourdon	8 feet tone.	23—Trompette	8 feet.
19—Prestant	4 feet.	24—Cromorne	8 feet tone.

Swell Organ, 8 Stops.

25—Flute harmonique	8 feet.	30—Trompette harmonique	8 feet.
26—Bourdon	8 feet tone.	31—Cor Anglais	8 feet.
27—Prestant	4 feet.	32—Voix Humaine	8 feet tone.
28—Flute douce	4 feet.		
29—Voix Celeste	8 feet.		

Pedal Organ, 8 Stops.

33—Grand Bourdon	32 feet tone.	37—Bombarde	16 feet.
34—Montre	16 feet.	38—Basse-contre	16 feet.
35—Contre-basse	16 feet.	39—Trompette	8 feet.
36—Flute ouverte	8 feet.	40—Clairon	4 feet.

Accessory Stops, Movements, &c.

1 to 8—Manual and Pedal Couplers.	23—Pneumatic lever attachment.
9 to 22—Fourteen Composition Pedals.	

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to tenor c, 25 notes.

13. The Madelaine, Paris.

The fine instrument in the Church of the Madelaine, at Paris, was built by the eminent artists who constructed the St. Denis Organ, MM. Cavaillé Coll. It was completed in 1846, and was opened in the Church on the 29th of October of that

year, with a performance of Vocal and Instrumental Sacred Music. The Organ has 4 Manuals and Pedal, and 48 Stops, distributed in the following manner:

Clavier du Grand Orgue, 12 Stops.

1—Montre	16 pieds.	7—Prestant	4 pieds.
2—Violon-Basse	16 —	8—Quinte	8 —
3—Montre	8 —	9—Doublette	2 —
4—Bourdon	8 —	10—Plein-Jeu, X ranks.	
5—Salicional	8 —	11—Trompette	8 —
6—Flute Harmonique	8 —	12—Cor Anglais	8 —

Clavier de Bombardes, 10 Stops.

13—Sous-Basse	16 pieds.	18—Octavin	2 —
14—Basse	8 —	19—Bombarde	16 —
15—Flute Harmonique	8 —	20—Trompette Harmonique	8 —
16—Flute Traversiere	8 —	21—Deuxieme Trompette	8 —
17—Flute Octaviante	4 —	22—Clairon	4 —

Clavier du Positif, 10 Stops.

23—Montre	8 pieds.	28—Dulciana	4 —
24—Viola di Gamba	8 —	29—Octavin	2 —
25—Flute douce	8 —	30—Trompette	8 —
26—Voix-celestes	8 —	31—Basson et Hautbois	8 —
27—Prestant	4 —	32—Clairon	4 —

Clavier de Récit. Expressif, 8 Stops.

33—Flute Harmonique	8 pieds.	37—Octavin	2 —
34—Bourdon	8 —	38—Voix Humaine	8 —
35—Muzette	8 —	39—Trompette Harmonique	8 —
36—Flute Octaviante	4 —	40—Clairon Harmonique	4 —

Clavier de Pédales, 8 Stops.

41—Quintaton	32 pieds.	45—Grosse Flute	8 —
42—Contre-Basse	16 —	46—Bombarde	16 —
43—Basse-Contre	16 —	47—Trompette	8 —
44—Violoncelle	8 —	48—Clairon	4 —

Combination Pedals, &c.

1—Positif to Great.	8—Tremulant to Choir and Swell.
2—Great to Pedal.	9—Great Reeds.
3—Bombarde to Positif	10—Bombarde Reeds.
4—Pedal to Great.	11—Choir Reeds.
5—Great Organ Sub-octave.	12—Swell Reeds.
6—Bombarde Sub-octave.	13—Pedal Reeds.
7—Pedal octave above.	

Compass.

Manuals, CC to f^3 in alt, 54 notes. | Pedal, CCC to tenor d, 27 notes.

13 B. St. Eustace, Paris.

The magnificent new Organ in the Church of St. Eustache was built by Ducroquet, of Paris, and was opened in the autumn of 1854. It contains 67 Sounding Stops, 4 Manuals, and a Pedal of 18 Stops. The following is a list of its contents :

Great Organ, 16 Stops.

1—Montre	16 feet.	9—Doublette	2 feet.
2—Gross Flute	8 feet.	10—Fourniture, V ranks.	
3—Flute	8 feet.	11—Cymballe, IV ranks.	
4—Flute Harmonique	8 feet.	12—Cornet, V ranks	
5—Bourdon	8 feet tone.	13—Euphone	16 feet.
6—Prestant	4 feet.	14—Trompette	8 feet.
7—Flute	4 feet.	15—Trompette	8 feet.
8—Nazard	3 feet.	16—Clairon	4 feet.

Clavier des Bombardes, 10 Stops.

17—Gamba	16 feet.	22—Gamba	4 feet.
18—Bourdon	16 feet tone.	23—Salicional	4 feet.
19—Gamba	8 feet.	24—Bombarde	16 feet.
20—Salicional	8 feet.	25—Trompette	8 feet.
21—Bourdon	8 feet tone.	26—Clairon	4 feet.

Positif, 14 Stops.

27—Montre	8 feet.	34—Cor Anglais	16 feet.
28—Bourdon	8 feet tone.	35—Trompette	8 feet.
29—Flute Harmonique	8 feet.	36—Hautbois	8 feet.
30—Keraulophone	8 feet.	36—Hautbois (free Reed)	8 feet.
31—Salicional	4 feet.	37—Cromorne	8 feet tone.
32—Flute ouverte	4 feet.	38—Basson	8 feet.
32—Plein jeu, V ranks		39—Clairon	4 feet.

Recit. Expressif, 10 Stops.

40—Bourdon	16 feet tone.	45—Trompette	8 feet.
41—Flute Harmonique	8 feet.	46—Hautbois	8 feet.
42—Bourdon	8 feet tone.	47—Euphone	8 feet.
43—Flute Harmonique	4 feet.	48—Voix Humaine	8 feet tone.
44—Trompette	16 feet.	49—Clairon	4 feet.

Pedale, 18 Stops.

50—Flute, montre	32 feet.	59—Salicional	4 feet.
51—Flute, wood	16 feet.	60—Bombarde	32 feet.
52—Contre-Basse	16 feet.	61—Bombarde	16 feet.
53—Bourdon	16 feet tone.	62—Basson	16 feet.
54—Flute	8 feet.	63—Trompette	8 feet.
55—Salicional	8 feet.	64—Trompette	8 feet.
56—Violoncello	8 feet.	65—Basson	8 feet.
57—Flute	8 feet.	66—Clairon	4 feet.
58—Flute ouverte	4 feet.	67—Basson	4 feet.

14. Amiens.

The Organ in the Cathedral at Amiens, which has a 16-feet front, was completed in the year 1429, and was built at the expense of Alphonse de Myrhe, one of the chamberlains of King Charles the Sixth. It still retains its interesting antique appearance, and stands at the west end of the nave, with the west entrance below, and a handsome circular window, filled with stained glass, above. The Amiens Cathedral Organ has 3 Manuals and Pedal, and 40 Stops; of which latter the following is a list:

Great, 16 Stops.

1—Montre	16 feet.	9—Tierce	1⅗ feet.
2—Bourdon	16 feet tone.	10—Furniture	
3—Montre	8 feet.	11—Cornett	
4—Bourdon	8 feet tone.	12—Bombarde	16 feet.
5—Flute	8 feet.	13—Trompette	8 feet.
6—Prestant	4 feet.	14—Trompette	8 feet.
7—Nazard	2⅔ feet.	15—Clarion	4 feet.
8—Doublette	2 feet.	16—Vox Humaine	8 feet.

Choir, 11 Stops.

17—Montre	8 feet.	23—Tierce	1⅗ feet.
18—Bourdon	8 feet tone.	24—Plein jeu	
19—Flute	8 feet.	25—Cornett	
20—Prestant	4 feet.	26—Trompette	8 feet.
21—Nazard	2⅔ feet.	27—Cromorne	8 feet tone.
22—Doublette	2 feet.		

Recit. 6 Stops.

28—Bourdon	8 feet tone.	31—Cornett	
29—Flute	8 feet.	32—Trompette	8 feet.
30—Prestant	4 feet.	33—Hautbois	8 feet.

Pedal, 7 Stops.

34—Flute	16 feet.	38—Bombarde	16 feet.
35—Bourdon	16 feet tone.	39—Trompette	8 feet.
36—Flute	8 feet.	40—Clarion	4 feet.
37—Flute	4 feet.		

15. Amiens.

The Organ in the Church of St. Remy, at Amiens, was built by the monks of St. Basil, and finished by them in the year 1842, at a cost of £1000. It has 34 Sounding Stops, 3 Manuals, and Pedal. The following is an enumeration of the Stops:

Great, 14 Stops.

1—Bourdon	16 feet tone.	8—Doublette	2 feet.
2—Montre	8 feet.	9—Fourniture	
3—Bourdon	8 feet tone.	10—Cornet	
4—Prestant	4 feet.	11—Trompette	8 feet.
5—Dulciana	4 feet.	12—Trompette	8 feet.
6—Flute	4 feet.	13—Voix Humaine	8 feet tone.
7—Nazard	2⅔ feet.	14—Clairon	4 feet.

Choir, 10 Stops.

15—Bourdon	8 feet tone.	20—Quarte de Nazard	2 feet.
16—Prestant	4 feet.	21—Fourniture	
17—Flute	4 feet.	22—Cornet	
18—Nazard	$2\frac{2}{3}$ feet.	23—Cremona, through	8 feet tone.
19—Doublette	2 feet.	24—Clairon	4 feet.

Swell, 6 Stops.

25—Bourdon	8 feet tone.	28—Nazard	$2\frac{2}{3}$ feet.
26—Prestant	4 feet.	29—Hautbois	8 feet.
27—Flute	4 feet.	30—Trompette	8 feet.

Pedal, 4 Stops.

31—Flute	16 feet.	33—Bombarde	16 feet.
32—Flute	8 feet.	34—Trompette	8 feet.

Compass.

Great, CC to f^3 in alt, 54 notes.	Swell, tenor c to f^3 in alt, 42 notes.
Choir, CC to f^3 in alt, 54 notes.	Pedal, FFF to tenor f, 25 notes.

16. Tours.

The Cathedral Organ at Tours possesses immense power. It was built by J. B. U. Le Fevre, of Rouen; and has 4 Manuals, and 60 Sounding Stops, supplied by 13 Bellows. The Stops are distributed in the following manner:

Great, 23 Stops.

1—Grosse Principal	32 feet.	13—Quint	3 feet.
2—Sub-Bourdon	32 feet tone.	14—Doublette	2 feet.
3—Prestant	16 feet.	15—Tierce	$1\frac{3}{5}$ feet.
4—Bourdon	16 feet tone.	16—Quint	$1\frac{1}{2}$ foot.
5—Montre	8 feet.	17—Mixture, XV ranks.	
6—Prestant	8 feet.	18—Cornett, V ranks.	
7—Principal	8 feet	19—First Trompette	8 feet.
8—Bourdon	8 feet tone.	20—Second Trompette	8 feet.
9—Quint	6 feet.	21—Third Trompette	8 feet.
10—Octave	4 feet.	22—First Clarion	4 feet.
11—Octave	4 feet.	23—Second Clarion	4 feet.
12—Tierce	$3\frac{1}{5}$ feet.		

Choir, 16 Stops.

24—Bourdon	16 feet tone.	32—Tierce	$1\frac{3}{5}$ feet.
25—Principal	8 feet.	33—Quint	$1\frac{1}{2}$ foot.
26—Prestant	8 feet.	34—Mixture, IX ranks.	
27—Bourdon	8 feet tone.	35—Cornett, V ranks.	
28—Octave	4 feet.	36—Trompette	8 feet.
29—Quint	3 feet.	37—Clarion	4 feet.
30—Octave	2 feet.	38—Cremorne	8 feet.
31—Doublette	2 feet.	39—Vox Humana	8 feet.

Bombarde, 6 Stops.

40—Bourdon	8 feet tone.	43—Bombarde	16 feet.
41—Octave	4 feet.	44—Trompette	8 feet.
42—Cornett, V ranks.		45—Clarion	4 feet.

Fourth Manual.

A general Echo to the Great Organ.

Pedal, 15 Stops.

46—Grosse Principal .... 16 feet.
47—Octave ..... 8 feet.
48—Prestant ..... 8 feet.
49—Quint ..... 6 feet.
50—Octave ..... 4 feet.
51—Flute ..... 4 feet.
52—Tierce ..... $3\frac{1}{5}$ feet.
53—Quint ..... 3 feet.
54—Octave ..... 2 feet.
55—Tierce ..... $1\frac{3}{5}$ feet.
56—Bombarde ..... 32 feet.
57—Trompette ..... 16 feet.
58—Trompette ..... 8 feet.
59—Clarion ..... 4 feet.
60—Clarion ..... 2 feet.

17. Rouen.

The Organ in the magnificent Church of St. Ouen, at Rouen, was built in the year 1630. It has 5 rows of keys; a Pedal Organ of 2 octaves in compass; 12 pairs of Bellows; and 49 Sounding Stops, distributed as follow:

Great, 13 Stops (Fourth Manual).

1—Montre ... ... 16 feet (throughout, in metal.)
2—Bourdon ..... 16 feet (throughout).
3—Montre ... ... 8 feet.
4—Bourdon ..... 8 feet.
5—Prestant ..... 4 feet.
6—Quint ..... $2\frac{2}{3}$ feet.
7—Quart ..... 2 feet.
8—Tierce ..... $1\frac{3}{5}$ foot.
9—Fourniture.
10—Cymbale.
11—Bassus de Trompette ... 8 feet.
12—Voix Humain ..... 8 feet.
13—Clarion ..... 4 feet.

Choir, 14 Stops (Lower Manual).

14—Prestant ..... 8 feet.
15—Bourdon ..... 8 feet.
16—Prestant ..... 4 feet.
17—Flute ..... 4 feet.
18—Nazard ..... $2\frac{2}{3}$ feet.
19—Doublette ..... 2 feet.
20—Tierce ..... $1\frac{3}{5}$ foot.
21—Cornett.
22—Galonbel.
23—Pleinjeu.
24—Cromorne ..... 8 feet.
25—Bassoon et Hautbois .. 8 feet.
26—Trompette ..... 8 feet.
27—Clarion ..... 4 feet.

Echo, 4 Stops (Upper Manual).

28—Flute ..... 8 feet.
29—Cornett.
30—Trompette ..... 8 feet.
31—Clarion ..... 4 feet.

Recit. 6 Stops (Second Manual).

32—Bourdon, Recit. ... ... 8 feet.
33—Flute, Recit. ..... 4 feet.
34—Cornett, Recit.
35—Hautbois, Recit. ..... 8 feet.
36—Trompette, Recit. .... 8 feet.
37—Clarion, Recit. ..... 4 feet.

Bombarde, 4 Stops (Third Manual).

38—Bombarde ..... 16 feet.
39—Trompette ..... 8 feet.
40—Clarion ..... 4 feet.
41—Cornett.

Pedal, 8 Stops.

42—Prestant ..... 16 feet.
43—Gamba ..... 16 feet.
44—Prestant ..... 8 feet.
45—Quint ..... $5\frac{3}{3}$ feet.
46—Prestant ..... 4 feet.
47—Bombarde ..... 16 feet.
48—Trompette ..... 8 feet.
49—Clarion ..... 4 feet.

18. Abbeville.

The Organ in the Cathedral at Abbeville is placed over the west entrance, where it has a majestic appearance. The Case of the Great Organ has five towers, with the smallest one in the centre: the Choir Organ Case has three towers, with the largest one in the centre. The 16-feet montre stands in front, and is of polished Tin. The Organ is an old one, and originally belonged to the Church of St. George, which building was completely demolished in the Revolution of 1793. The Organ escaped sharing the same fate through the care of Honoré Blondin, the nephew of whom is the present Organist. The instrument was enlarged and thoroughly repaired by M. Charles Lefevre, of Abbeville, about ten years since, and now contains 42 Stops, distributed as follow:

Great, 18 Stops.

1—Montre (throughout)	16 feet.	10—Doublette	2 feet.
2—Bourdon (throughout)	16 feet tone.	11—Flute	2 feet.
3—Montre	8 feet.	12—Fourniture	
4—Bourdon	8 feet tone.	13—Grand Cornett	
5—Flute	8 feet.	14—Trompette	8 feet.
6—Prestant	4 feet.	15—Trompette	8 feet.
7—Flute	4 feet.	16—Clarion	4 feet.
8—Flute tacet	4 feet.	17—Cromorne (throughout)	8 feet.
9—Nazard	$2\frac{2}{3}$ feet.	18—Voix Humaine	8 feet.

Choir, 12 Stops.

19—Bourdon	8 feet tone.	25—Petit Nazard	$1\frac{1}{3}$ foot.
20—Montre	4 feet.	26—Fifre	1 foot.
21—Flute a Cheminee	4 feet.	27—Fourniture	
22—Nazard	$2\frac{2}{3}$ feet.	28—Hautbois tacet	8 feet.
23—Super octave	2 feet.	29—Clarion	4 feet.
24—Doublette	2 feet.	30—Cromorne (throughout)	8 feet.

Swell, 6 Stops.

31—Dulciana	8 feet.	34—Flute	2 feet.
32—Flute	4 feet.	35—Hautbois	8 feet.
33—Nazard	$2\frac{2}{3}$ feet.	36—Trompette	8 feet.

Pedal, 6 Stops.

37—Fluto Allemande	16 feet.	40—Musette	
38—Fluto	8 feet.	41—Bombarde, wood	16 feet.
39—Fluto	4 feet.	42—Trompette, metal	8 feet.

There are four Manuals: the lower one for the Choir Organ; the second for the Great; the third for the Pedal Organ, which is of the same compass as the other Organs; and the fourth for the Swell. The compass of the Great, Choir, and Pedal is from CC to f^3 in alt. The Swell, to Tenor f; the Pedal-board is from CCC to Tenor f, two octaves and a half. The Manuals are coupled together by being drawn out about half an inch.

19. St. Sulpice, Paris.

The large Organ at St. Sulpice, in Paris, was long considered the most complete instrument in France. The new one at St. Denis, however, now rather exceeds it in the number of the Stops. It originally had 5 Manual Organs; Great, Choir,

Bombarde, Recitative, and Echo, besides the Pedal Organ, as at Rouen; but the number of Manuals has within the last few years been reduced to 4, and many new Stops introduced by MM. Cavaillé: so that the instrument now has 4 Manuals; Pedal Organ of 12 Stops, and, altogether, 66 Sounding Stops. It originally had 14 pairs of bellows, 6 feet in length and $3\frac{1}{2}$ in breadth; 6 for the Great Organ, 4 for the Choir, &c. and 4 for the Pedal. The distribution of the Stops is as follows:

Grand Organ, 22 Stops.

1—	Montre ....the upper pipes of pewter, the lower ones of wood.	32 feet,
2—	Montre ....of pewter	16 feet.
3—	Bourdon....of wood	16 feet tone.
4—	Montre ....of pewter	8 feet.
5—	Bourdon....of wood	8 feet tone.
6—	Flute .....of metal	8 feet.
*7—	Gamba	8 feet.
*8—	Salcional	8 feet.
9—	Prestant	4 feet.
10—	Nazard	$2\frac{2}{3}$ feet.
11—	Doublette ..of pewter	2 feet.
12—	Tierce	$1\frac{3}{5}$ feet.
13—	Fourniture.....IX ranks.	
*14—	Fourniture	
15—	Cymbale .....IV ranks.	
16—	Cornett..... V ranks.	
*17—	Euphorne	16 feet.
18—	Trompette ..of pewter	8 feet.
19—	Trompette ..of pewter	8 feet.
20—	Clarion ....of pewter	4 feet.
*21—	Clarion	4 feet.
*22—	Clarinette	8 feet.

The Great Organ originally contained 21 Stops, not including those marked with an asterisk, which are subsequent insertions, and introduced chiefly in the places of a Grosse Nazard, $5\frac{1}{3}$ feet; Quarte de Nazard, 2 feet; Grosse Tierce, $3\frac{2}{5}$ feet; Voix Humaine; and a Third Trumpet.

Positif, 18 Stops.

23—	Bourdon	16 feet tone.	32—Fourniture, V ranks.
24—	Montre	8 feet.	33—Cymbale . IV ranks.
25—	Bourdon	8 feet tone.	34—Cornett .. V ranks.
26—	Flute	8 feet.	35—Trompette ..... 8 feet.
*27—	Gamba	8 feet.	36—Clarion ..... 4 feet.
28—	Prestant	4 feet.	37—Bassoon ..... 8 feet.
*29—	Dulciana	4 feet.	*38—Hautbois ..... 8 feet.
30—	Nazard	$2\frac{2}{3}$ feet.	39—Clarionette ..... 8 feet.
31—	Doublette	2 feet.	40—Cromorne ..... 8 feet.

The original Positif Specification included a "Quart de Nazard, Tierce, and Larigot;" for which a Gamba, Dulciana, and Hautbois have been substituted, as indicated by the asterisks above.

Recit. 10 Stops.

41—Bourdon	16 feet tone.	46—Cornett, V ranks.	
42—Flute	8 feet.	47—Trompette	8 feet.
43—Flute Harmonique	8 feet.	48—Hautbois	8 feet.
44—Bourdon	8 feet tone.	49—Cor Anglais	8 feet.
45—Prestant	4 feet.	50—Voix Humaine	8 feet.

Bombarde Clavier, 4 Stops.

51—Bombarde	16 feet.	53—Clarion	4 feet.
52—Trompete	8 feet.	54—Cornett, V ranks.	

Pedal, 12 Stops.

*55—Flute	32 feet.	61—Bombarde	32 feet.
56—Flute	16 feet.	62—Bombarde	16 feet.
*57—Bourdon	16 feet tone.	63—Trompette	8 feet.
58—Flute	8 feet.	64—Trompette	8 feet.
59—Flute	8 feet.	*65—Bassoon	8 feet.
60—Flute	4 feet.	66—Clarion	4 feet.

The Pedal originally contained a 32-feet Sounding Stop only (Grosse Bourdon, 32 feet tone), which has been removed, and a Wood Open Stop, or, as it is labelled, a Flute of 32 feet, placed in its stead. There was also a Grosse Nazard, $10\frac{2}{3}$ feet, which has made way for a Bourdon of 16-feet tone; and a Bassoon has likewise been added. See stars above.

20. Beauvais.

The Organ in the Cathedral at Beauvais has 5 Manuals and Pedal, and 64 Sounding Stops, of which the following is a list:

Grand Orgue (Great), 19 Stops.

1—Montre	16 feet.	11—Quarte de Nasard	2 feet.
2—Bourdon	16 feet tone.	12—Tierce	$1\frac{2}{5}$ foot.
3—Montre	8 feet.	13—Grosse Fourniture	
4—Flute	8 feet.	14—Fourniture	
5—Gamba	8 feet.	15—Cymbale	
6—Bourdon	8 feet tone.	16—Great Cornet	
7—Grosse Nasard	$5\frac{1}{3}$ feet.	17—Premiere Trompette.	8 feet.
8—Prestant	4 feet.	18—Deuxieme Trompette	8 feet.
9—Grosse Tierce	$3\frac{3}{5}$ feet.	19—Clairon	4 feet.
10—Nasard	$2\frac{2}{3}$ feet.		

Positif (Choir), 14 Stops.

20—Montre	8 feet.	27—Fourniture, III ranks	
21—Bourdon	8 feet tone.	28—Cymbale, II ranks	
22—Flute	8 feet.	29—Cornet, V ranks	
23—Prestant	4 feet.	30—Trompette	8 feet.
24—Nasard	$2\frac{2}{3}$ feet.	31—Clairon	4 feet.
25—Doublette	2 feet.	32—Cromorne	8 feet tone.
26—Tierce	$1\frac{3}{5}$ foot.	33—Basson	8 feet.

Bombarde, 4 Stops.

34—Bombarde	16 feet.	36—Clairon	4 feet.
35—Trompette	8 feet.	37—Grand Cornet	

Recit. Echo, 14 Stops.

38—Salicional	8 feet.	45—Doublette	2 feet.
39—Bourdon	8 feet tone.	46—Quintadene	2 feet.
40—Flute	8 feet.	47—Tierce	$1\frac{3}{5}$ foot.
41—Flute Harmonique	8 feet.	48—Trompette	8 feet.
42—Principal	4 feet.	49—Cor Anglais	8 feet.
43—Flute douce	4 feet.	50—Hautbois	8 feet.
44—Quinte	$2\frac{2}{3}$ feet.	51—Voix Humaine	8 feet tone.

Swell, 3 Stops.

52—Conoclite.	54—Terpomele.
53—Euphone.	

Pedal, 10 Stops.

55—Flute ouverte	16 feet.	60—Flute	4 feet.
56—Contre-basse	16 feet.	61—Bombarde	24 feet.
57—Bourdon	16 feet tone.	62—Trompette	12 feet.
58—Flute	8 feet.	63—Clairon	6 feet.
59—Quinte	$5\frac{1}{3}$ feet.	64—Dermogloste	

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, FFF to tenor f, 25 notes.

21. Antwerp.

The Organ in the Cathedral at Antwerp was built by De la Haye, of Antwerp, in 1645, and repaired by Folder, of Brussels, in 1834. It has 44 Stops, 3 Manuals, and Pedal. The following is a list of its contents:

Great Organ, 18 Stops.

1—Montre	16 feet.	11—Tierce	$1\frac{3}{5}$ foot.
2—Bourdon	16 feet tone.	12—Fourniture	
3—Montre	8 feet.	13—Cimbal	
4—Bourdon	8 feet tone.	14—Cornett	
5—Flute traversiere	8 feet.	15 Bombarde discant / Bombarde basse	16 feet.
6—Gross Nazard	$5\frac{1}{3}$ feet.		
7—Prestant	4 feet.	16 Trompette discant / Trompette basse	8 feet.
8—Flute	4 feet.		
9—Nazard	$2\frac{2}{3}$ feet.	17—Clairon	4 feet.
10—Doublette	2 feet.	18—Vox-humaine	8 feet tone.

Choir Organ, 10 Stops.

19—Montre	8 feet.	25—Fourniture	
20—Bourdon	8 feet tone.	26—Cornett	
21—Prestant	4 feet.	27 Trompette discant / Trompette basse	8 feet.
22—Flute	4 feet tone.		
23—Nazard	$2\frac{2}{3}$ feet.	28—Hautbois	8 feet.
24—Doublette	2 feet.		

Swell Organ, 6 Stops.

29—Montre discant	8 feet.	32—Flute	4 feet.
30—Bourdon	8 feet tone.	33—Doublette	2 feet.
31—Prestant	4 feet.	34—Cromhorne	8 feet.

Pedal, 10 Stops.

35—Montre	16 feet.	40—Flute	4 feet.
36—Bourdon	16 feet tone.	41—Fourniture.	
37—Prestant	8 feet.	42—Bombarde	16 feet.
38—Bourdon	8 feet tone.	43—Trompette	8 feet.
39—Prestant	4 feet.	44—Clairon	4 feet.

Compass.

Manuals, CC to f^3 in alt. | Pedals, FFF to tenor f.

22. Antwerp.

The Organ in the Church of St. Paul at Antwerp was built by Terbrugen, of Antwerp, in the year 1670, and was repaired and improved in 1825. It has 3 Manuals and Pedal, and 51 Stops. The Pedal-board is very inconveniently arranged, and the touch is disagreeable; otherwise it is a very satisfactory instrument, and rather superior to that in the Cathedral. The following is a list of its Stops:

Great Organ, 19 Stops.

1—Principal	16 feet.	11—Nazard	3 feet.
2—Bourdon	16 feet tone.	12—Doublette	2 feet.
3—Montre	8 feet.	13—Fourniture.	
4—Bourdon	8 feet tone.	14—Cimbale.	
5—Quintaton	8 feet tone.	15—Cornett.	
6—Grand Nazard	6 feet.	16—Bombarde	16 feet.
7—Prestant	4 feet.	17 Trompette discant / Trompette basse	8 feet.
8—Flute	4 feet.		
9—Flute traverse	4 feet.	18—Clairon	4 feet.
10—Gros Tierce	$3\frac{1}{5}$ feet.	19—Vox Humaine	8 feet.

Choir Organ, 15 Stops.

20—Bourdon	8 feet tone.	28—Tierce	$1\frac{3}{5}$ feet.
21—Viol di Gamba	8 feet.	29—Fourniture.	
22—Prestant	4 feet.	30—Cornett.	
23—Flute	4 feet.	31—Trompette	8 feet.
24—Flute traverse	4 feet.	32—Hautbois	8 feet.
25—Nazard	3 feet.	33—Vox Angelica	8 feet.
26—Doublette	2 feet.	34—Bassoon	8 feet.
27—Flute Champ	2 feet.		

Echo, 10 Stops.

35—Bourdon	8 feet tone.	40—Tierce	$1\frac{3}{5}$ feet.
36—Prestant	4 feet.	41—Fourniture.	
37—Flute	4 feet.	42—Cornett.	
38—Nazard	3 feet.	43—Trompette	8 feet.
39—Doublette	2 feet.	44—Vox Humaine	8 feet.

Pedal, 7 Stops.

45—Prestant	16 feet.	49—Bombarde	16 feet.
46—Quintaton	16 feet tone.	50—Trompette	8 feet.
47—Flute	8 feet.	51—Clairon	4 feet.
48—Prestant	4 feet.		

Compass.

Manuals, CC to f^3 in alt. | Pedals, CCC to tenor c.

23. Brussels.

The Organ in the Cathedral Church of St. Gudule, at Brussels, contains 47 Stops, 3 Manuals, and Pedal containing a 32-feet Reed. The following list shows the distribution and names of the Stops :

Great, 18 Stops.

1—Bordun, discant	32 feet tone.	11—Quint	$1\frac{1}{3}$ foot.
2—Montre	16 feet.	12—Fourniture.	
3—Bordun	16 feet tone.	13—Cymballes.	
4—Prestant	8 feet.	14—Cornet.	
5—Bordun	8 feet tone.	15—Cornet, lowest rank, Bordun	16 feet.
6—Octave	4 feet.	16—Bombarde	16 feet.
7—Flute	4 feet.	17—Trompet	8 feet.
8—Nazard	$2\frac{2}{3}$ feet.	18—Clarin Bass	4 feet.
9—Doublette	2 feet.		
10—Tierce	$1\frac{3}{5}$ foot.		

Choir, 12 Stops.

19—Bordun	16 feet tone.	25—Octave	2 feet.
20—Bordun	8 feet tone.	26—Tierce	$1\frac{3}{5}$ foot.
21—Flute	8 feet.	27—Larigot	$1\frac{1}{3}$ foot.
22—Prestant	4 feet.	28—Fourniture.	
23—Flute	4 feet.	29—Cornet.	
24—Nazard	$2\frac{2}{3}$ feet.	30—Hautbois	8 feet.

Echo, 7 Stops.

31—Prestant	8 feet.	35—Doublette	2 feet.
32—Bourdon	8 feet tone.	36—Fourniture.	
33—Octave	4 feet.	37—Trompete	8 feet.
34—Flute	4 feet.		

Pedal, 10 Stops.

38—Montre	16 feet.	43—Flute	4 feet.
39—Bourdon	16 feet tone.	44—Quarte	2 feet.
40—Flute	8 feet.	45—Buzain	32 feet.
41—Bourdon	8 feet tone.	46—Bombarde	16 feet.
42—Quinte	$5\frac{1}{3}$ feet.	47—Trompete	8 feet.

24. Liege.

The Organ in the Church of St. Martin at Liege, built by Clerinex, at a cost of £1000, has 3 Manuals and Pedal, and 36 Sounding Stops, of which the following is a list :

Great, 14 Stops.

1—Bourdon	16 feet tone.	8—Super Octave	2 feet.
2—Principal	8 feet.	9—Sesquialtera, III ranks	3 feet.
3—Bourdon	8 feet tone.	10—Fourniture, IV ranks	
4—Gamba	8 feet.	11—Cornett, IV ranks.	
5—Flute Travers	8 feet.	12—Trompet	8 feet.
6—Prestant	4 feet.	13—Clarion	4 feet.
7—Flute pointue	4 feet.	14—Cromhorne	8 feet.

Choir, 9 Stops.

15—Salcional	8 feet.	20—Sesquialtera.	
16—Bourdon	8 feet tone.	21—Cornet.	
17—Prestant	4 feet.	22—Trompete	8 feet.
18—Old Flute	4 feet.	23—Hautbois	8 feet.
19—Super octave	2 feet.		

Echo, 6 Stops.

24—Bourdon	8 feet tone.	27—Super octave	2 feet.
25—Prestant	4 feet.	28—Cornet.	
26—Flageolet.		29—Trompete	8 feet.

Pedal, 6 Stops.

30—Montre, metal	16 feet.	33—Montre	8 feet.
31—Flute, wood open	16 feet.	34—Bombarde*	16 feet.
32—Soubasse	16 feet tone.	35—Bombarde	8 feet.

25. Cologne.

The present Organ in the Cathedral of Cologne is composed partly of an older instrument, said to have been about 300 years old at the time of its reconstruction. Maas, the late Organ-builder at Cologne, repaired and considerably added to it about ten years since; more than half the Pipes, the mechanism, &c. being made by him. The Organ has now 40 Stops, 3 Manuals, and Pedal; the names and distribution of the former being as follow:

Great, 11 Stops.

1—Principal, tin, in front,	16 feet.	7—Rauschwerk . V ranks,	$2\frac{2}{3}$ feet.
2—Octave	8 feet.	8—Cymbal . . . IV ranks.	
3—Viol di Gamba	8 feet.	9—Sesquialtera, II ranks,	$2\frac{2}{3}$ feet.
4—Hohlflote	8 feet.	10—Posaune	16 feet.
5—Super-octave	4 feet.	11—Trompete	8 feet.
6—Flautin	2 feet.		

Choir, 11 Stops.

12—Principal	8 feet.	18—Cornet . . IV ranks.	
13—Rohrflote	8 feet tone.	19 {Bourdon, discant . . / Contrafagot, bass . .}	16 feet.
14 {Viola di Gamba, discant / Violoncello bass . . .}	8 feet.	20—Clairon	8 feet.
15—Queerflote, discant . .	8 feet.	21—Krumhorn	8 feet tone.
16—Rohrflote	4 feet tone.	22—Glockenspiel.	
17—Super-octave	2 feet.		

Echo, 9 Stops.

23 {Hohlflote, discant . . / Hohlflote, bass . . .}	8 feet.	28—Super-flote	2 feet.
24—Queerflote, discant . .	8 feet.	29—Quint-flote	$1\frac{1}{3}$ foot.
25—Prestant	4 feet.	30—Cymbal.	
26—Hohlflote	4 feet.	31 {Clarinett, discant . . / Clarinett, bass . . .}	8 feet tone.
27—Super-octave	2 feet.		

* The CCC Pipe, 12 inches in diameter.

Pedal, 9 Stops.

32—Contra Violon	16 feet.	37—Posaune	16 feet.
33—Subbass	16 feet tone.	38—Trompete.....	8 feet.
34—Violon.....	8 feet.	39—Clairon.....	4 feet.
35—Octave Subbass	8 feet tone.	40—Clarinett.....	2 feet.
36—Super octave	4 feet.		

Compass.

Manuals, CC to f^3 in alt .... 54 notes.
Pedal, CCC to tenor c .... 25 notes.

26. Cologne.

The Organ in the Minorets Church is said to be no less than 400 years old. Its tone is exceedingly good; and it has 33 Stops, of which the following is a list:

Great, 15 Stops.

1—Bourdon.....	16 feet tone.	9—Salicena, oder Quint .	$2\frac{2}{3}$ feet.
2—Prestant.....	8 feet.	10—Super-octave	2 feet.
3 Gamba, discant .... / Gamba, bass	8 feet.	11—Quint	$1\frac{1}{3}$ foot.
4—Violoncello	8 feet.	12—Mixture, III and IV ranks.	
5—Hollpfeife	8 feet.	13 Trompet, discant .. / Trompet, bass	8 feet.
6—Octave	4 feet.	14—Clairon	4 feet.
7—Flote	4 feet.	15—Vox Humana.....	8 feet tone.
8—Wald-flote.....	4 feet.		

Choir, 12 Stops.

16—Hollpfeife	8 feet.	22—Octave	2 feet.
17—Flaut Traverse	8 feet.	23—Cymbal, III ranks.	
18—Prestant.....	4 feet.	24—Carillon, II ranks.	
19—Flaut douce	4 feet.	25—Hautbois.....	8 feet.
20—Vox Angelica	4 feet.	26—Clarinet	8 feet tone.
21—Quint flaut.....	$2\frac{2}{3}$ feet tone.	27—Vox Humana.....	8 feet tone.

Pedal, 6 Stops.

28—Principal, in front ..	16 feet.	31—Posaune.....	16 feet.
29—Octave-bass	8 feet.	32—Trompete	8 feet.
30—Super-octave	4 feet.	33—Clairon	4 feet.

Accessory Stops.

1—Choir to Great. | 2—Great to Pedal.

Compass.

Manuals, CC to d^5 in alt, no top c^3 sharp, 50 notes.
Pedal, CCC to EE, 17 notes.

27. Cologne.

The Organ in the Jesuits' Church at Cologne is a particularly fine instrument. It was originally built about the year 1750, and was repaired and enlarged in 1822. It has now 34 Stops, 3 Manuals, and a Pedal of 6 Stops.

Great, 11 Stops.

1—Principal	16 feet.	7—Superoctave	2 feet.
2—Prestant	8 feet.	8—Mixture, IV ranks.	
3—Gamba	8 feet.	9—Cornet .. V ranks.	
4—Bourdon	8 feet tone.	10 Trompete, discant .. Trompete, bass	8 feet.
5—Octave	4 feet.		
6—Quint	2⅔ feet.	11—Clairon	4 feet.

Choir, 11 Stops.

12—Prestant	8 feet.	18—Flautino	4 feet.
13—Gamba	8 feet.	19—Superoctave	2 feet.
14—Hollpfeif	8 feet.	20—Carillon, II ranks.	
15—Travers-flote	8 feet.	21—Cornet ..V ranks.	
16—Octave	4 feet.	22—Clarinet	8 feet tone.
17—Flote	4 feet.		

Echo, 6 Stops.

23—Gemshorn	8 feet.	26—Flote	4 feet.
24—Hollpfeife	8 feet.	27—Hautbois	8 feet.
25—Prestant	4 feet.	28—Vox Humana	8 feet tone.

Pedal, 6 Stops.

1—Subbass	16 feet.	4—Posaune	16 feet.
2—Octave	8 feet.	5—Trompete	8 feet.
3—Violone	8 feet.	6—Clairon	4 feet.

Accessory Stops, Movements, &c.

1—Choir to Great.	3—Great to Pedal.
2—Echo to Choir.	4—Tremulant to Choir.

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to FF, 1½ octave, 18 notes.

28. Cologne.

The Church of St. Maria de Capitol, at Cologne, contains an imposing-toned Organ, erected by Ludwig König, of Cologne, in 1767. In the year 1839 a Cornett and Flautino were added, and the Organ raised to its present pitch by Engelbert Maas, of Cologne. It has now 40 Stops; 3 Manuals, and Pedal of 10 Stops. The following is the disposition:

Great, 12 Stops.

1—Principal	16 feet.	7—Quint	2⅔ feet.
2—Octave	8 feet.	8—Mixture, IV ranks..	2 feet.
3—Viola di Gamba	8 feet.	9—Cymbel, III ranks..	1 foot.
4—Hollpfeif	8 feet.	10—Cornett, IV ranks.	
5—Octave	4 feet.	11—Trompete	8 feet.
6—Flaut	4 feet.	12—Clairon	4 feet.

Choir, 12 Stops.

13—Prestant	8 feet.	20—Flautino	2 feet.
14—Viola di Gamba	8 feet.	21—Quint Flaut	1⅓ foot.
15—Hollpfeif	8 feet.	22—Carillon, II ranks ..	4 feet.
16—Flaut travers discant .	8 feet.	23—Vox Humana	8 feet tone.
17—Octave	4 feet.	24 Clarinett, discant .. Hautbois, bass	8 feet.
18—Flaut	4 feet.		
19—Superoctave	2 feet.		

Echo, 6 Stops.

25—Hollpfeife	8 feet.	29—Hautbois, discant	8 feet.
26—Gemshorn	4 feet.	30—Vox Humana, discant / Vox Humana, bass	8 feet tone.
27—Flaut	4 feet tone.		
28—Super-octave	2 feet.		

Pedal, 10 Stops.

1—Bourdon	16 feet.	6—Octave	4 feet.
2—Viola di Gamba	8 feet.	7—Posaune	16 feet.
3—Prestant	8 feet.	8—Trompete	8 feet.
4—Gemshorn	8 feet.	9—Clairon	4 feet.
5—Quinte	$5\frac{1}{3}$ feet.	10—Clarino	2 feet.

Accessory Stops, Movements, &c.

1—Great to Pedal. | 2—Tremulant Echo. | 3—Tremulant Positif.

Compass.

Manuals, CC to f^3 in alt, 54 notes. | Pedal, CCC to Gamut A, 22 notes.

29. Cologne.

The Organ in the Church of St. Columba, at Cologne, was made by König, in 1753; and presents the remarkable peculiarity, for a German Organ of that size, of being entirely without Pedal Stops. The following is a list of the contents of the above-named instrument:

Great, 12 Stops.

1—Prestant	16 feet.	7—Super-octave	2 feet.
2—Principal	8 feet.	8—Sesquialtera, III ranks,	$2\frac{2}{3}$ feet.
3—Viol di Gamba	8 feet.	9—Mixtur, IV ranks,	2 feet.
4—Gedact	8 feet tone	10—Posaune	16 feet.
5—Octava	4 feet.	11—Trompet	8 feet.
6—Flaut douce	4 feet.	12—Clairon	4 feet.

Choir, 9 Stops.

13—Gedact	8 feet tone.	18—Quint-Flaut	$1\frac{1}{3}$ foot.
14—Prestant	4 feet.	19—Carillon, II ranks.	
15—Flaut travers	4 feet.	20—Clarinett, discant	8 feet tone.
16—Flaut douce	4 feet.	21—Vox Humana	8 feet tone.
17—Octava	2 feet.		

30. Cologne.

The Organ in the Church of St. Ursula is a new instrument, and was built by Heinrich, of Cologne. It contains 25 Stops, 2 Manuals, and a Pedal of 6 Stops. The following is a list of its contents:

Great, 11 Stops.

1—Bourdon	16 feet tone.	7—Quinte	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	8—Octave	2 feet.
3—Bourdon	8 feet tone.	9—Mixtur, IV ranks.	
4—Gamba	8 feet.	10—Cornet.	
5—Octave	4 feet.	11—Trompet	8 feet.
6—Flote	4 feet.		

Choir, 8 Stops.

12—Prestant	8 feet.	16—Flaut	4 feet.
13—Bourdon	8 feet tone.	17—Octave	2 feet.
14—Salicional	8 feet.	18—Oboe	8 feet.
15—Fernflote	4 feet.	19—Basset Horn	8 feet.

Pedal, 6 Stops.

20—Subbass	16 feet.	23—Posaune	16 feet.
21—Violoncello	8 feet.	24—Trompet	8 feet.
22—Octave-bass	8 feet.	25—Clairon	4 feet.

31. Bonn.

There is a fine old Organ in the Cathedral at Bonn, containing 30 Sounding Stops, among which is a particularly fine 16-feet Posaune on the Pedal, of wood. The instrument has 2 Manuals and Pedal, among which the Stops are thus distributed:

Great, 12 Stops.

1—Bourdon	16 feet tone.	7—Quint	3 feet.
2—Principal	8 feet.	8—Super octave	2 feet.
3—Bourdon	8 feet tone.	9—Octavine	1 foot.
4—Gamba	8 feet.	10—Mixture.	
5—Salcional	8 feet.	11—Trompete	8 feet.
6—Octave	4 feet.	12—Clarion	4 feet.

Choir, 11 Stops.

13—Bourdon	8 feet tone.	19—Octave	3 feet.
14—Flote discant	8 feet.	20—Mixture.	
15—Principal	4 feet.	21—Trompete	8 feet.
16—Octave	4 feet.	22—Bassoon	8 feet.
17—Rohrflote	4 feet tone.	23—Vox Humana	8 feet.
18—Quint	3 feet.		

Pedal, 6 Stops.

24—Subbasse	16 feet tone.	27—Posaune	16 feet.
25—Principal	8 feet.	28—Posaune	8 feet.
26—Violoncello	8 feet.	29—Posaune	4 feet.

32. Bonn.

The Organ in the Protestant Church at Bonn, by Weil, is an excellent instrument. It has 19 Stops, of which the following is a list:

Great, 9 Stops.

1—Bourdon	16 feet tone.	6—Flote	4 feet.
2—Principal	8 feet.	7—Salcional	4 feet.
3—Bourdon	8 feet tone.	8—Super octave	2 feet.
4—Gamba	8 feet.	9—Trompete	8 feet.
5—Octave	4 feet.		

Choir, 7 Stops.

1—Flote	8 feet.	5—Rohrflote	4 feet.
2—Hollflote	8 feet.	6—Super octave	2 feet.
3—Harmonica	8 feet.	7—Krumhorn	8 feet.
4—Principal	4 feet.		

Pedal, 3 Stops.

1—Principal.. 16 feet. | 2—Sub-bass.. 16 feet tone. | 3—Octave .. 8 feet.

33. Coblentz.

The Organ in the Church of Castor, at Coblentz, has 39 Stops, distributed among 3 Manuals and Pedal, as follow:

Great, 16 Stops.

1—Gross-gedact	16 feet tone.	10—Quint	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	11—Super-octave	2 feet.
3—Viol di Gamba	8 feet.	12—Vox angelica	2 feet.
4—Holpfeif	8 feet.	13—Terz	$1\frac{3}{5}$ foot.
5—Quintadena	8 feet tone.	14—Mixtur	1 foot.
6—Coppel	8 feet.	15—Cornet	8 feet.
7—Octave	4 feet.	16 Trompet, treble / Trompet, bass	8 feet.
8—Salicional	4 feet.		
9—Fleut	4 feet.		

Choir, 9 Stops.

17—Bourdon	8 feet tone.	22—Octave	2 feet.
18—Flaut Ravena	8 feet.	23—Mixtur.	
19—Principal	4 feet.	24—Krumhorn	8 feet tone.
20—Flaut	4 feet.	25—Vox Humana	8 feet tone.
21—Quint	$2\frac{2}{3}$ feet.		

Echo, 7 Stops.

26—Bourdon	8 feet tone.	30—Octave	2 feet.
27—Flaut	4 feet.	31—Trompet	8 feet.
28—Salicional	4 feet.	32—Vox Humana	8 feet tone.
29—Quint	$2\frac{2}{3}$ feet.		

Pedal, 7 Stops.

33—Violon-bass	16 feet.	37—Posaune-bass	16 feet.
34—Sub-bass	16 feet tone.	38—Clairon-bass	4 feet.
35—Principal-bass	8 feet.	39—Cornet-bass	2 feet.
36—Octave-bass	4 feet.		

Accessory Stops, Movements, &c.

1—Choir to Great. | 2—Great to Pedal. | 3—Tremulant Echo.

Compass.

Manuals, CC to d^3 in alt, 51 notes. | Pedal, CCC to Gamut G, 20 notes.

34. Strasbourg.

Strasbourg has long been famous for its Bell-founders, Clock-makers, Organ-builders, and for its Freemasons. So early as the 13th century there were several Organs in its Cathedral, very curious in their structure, and sonorous in their tone. The present instrument was built by Silberman, of Strasbourg, and was completed in August, 1716. It has 42 Sounding Stops, of which number 7 are on the Pedal; 2242 Pipes; and 6 Bellows, 12 feet by 6. The Organ is placed on the north side of the Nave, where it projects from the Triforium about 50 feet above the pavement of the Cathedral. The following are the particulars of the instrument:

Great, 13 Stops.

1—Bourdon..... 16 feet tone.
2—Montre, tin ..... 8 feet.
3—Bourdon..... 8 feet tone.
4—Prestant..... 4 feet.
5—Nazard ..... 2⅔ feet.
6—Doublette ..... 2 feet.
7—Tierce ..... 1⅗ feet.
8—Fourniture.
9—Cymbal.
10—Cornett, V ranks.
11 { Trompette, discant.. / Trompette, basse ... } 8 feet.
12—Trompette..... 8 feet.
13 { Clairon, discant.... / Clairon, basse ..... } 4 feet.

Choir, 11 Stops.

14—Montre, tin ..... 8 feet.
15—Bourdon..... 8 feet tone.
16—Prestant..... 4 feet.
17—Flute ..... 4 feet.
18—Nazard ..... 2⅔ feet.
19—Doublette ..... 2 feet.
20—Tierce..... 1⅗ foot.
21—Larigot..... 1½ foot.
22—Fourniture.
23—Cymbal.
24 { Cromhorn, discant .. / Cromhorn, basse ... } 8 feet.

Echo, 11 Stops.

25—Montre, tin ..... 8 feet.
26—Gamba ..... 8 feet.
27—Bourdon..... 8 feet tone.
28—Salicional ..... 8 feet.
29—Prestant..... 4 feet.
30—Flute ..... 4 feet.
31—Flute magique .... 4 feet.
32—Doublette..... 2 feet.
33—Hautbois..... 8 feet.
34—Vox Humaine .... 8 feet.
35 { Trompet, discant ... / Bassoon, basse .... } 8 feet.

Pedal, 7 Stops.

36—Montre, tin ..... 16 feet.
37—Bourdon..... 16 feet tone.
38—Montre..... 8 feet.
39—Prestant..... 4 feet.
40—Bombarde ..... 16 feet.
41—Trompette..... 8 feet.
42—Clairon ..... 4 feet.

Accessory Stops, Movements, &c.

Tremulant to Great. | Tremulant to Echo.

The Echo and Choir Manuals couple to the Great by being drawn out a little.

Compass.

Manuals, CC to c^3 in alt, 49 notes. | Pedal, CCC to tenor c, 25 notes.

35. Strasbourg.

The Organ in St. Thomas's Church is also the work of Silberman, and bears the date of 1740. It has undergone some alterations by Weltzer, a resident Organ-builder in Strasbourg. It contains 36 Sounding Stops, of which number 7 are on the Pedal. The distribution of the Stops is as follows:

Great, 13 Stops.

1—Bourdon, stopped metal to tenor c, then wood, 16 feet tone.
2—Montre..... 8 feet.
3—Bourdon, metal .... 8 feet tone.
4—Salicional ..... 8 feet.
5—Prestant..... 4 feet.
6—Flute ..... 4 feet.
7—Nazard ..... 2⅔ feet.
8—Doublette ..... 2 feet.
9—Fourniture, IV ranks.
10—Cornett.... V ranks.
11 { Trompette, discant.. / Trompette, basse... } 8 feet.
12 { Clairon, discant .... / Clairon, basse..... } 4 feet.
13—Vox Humaine .... 8 feet.

Choir, 8 Stops.

14—Bourdon, metal	8 feet tone.	18—Flute	4 feet.
15—Quintatena.....	8 feet.	19—Nazard.....	3 feet.
16—Prestant.....	4 feet.	20—Doublette	2 feet.
17—Cordedain	4 feet.	21—Cromorne	8 feet.

Echo, 8 Stops.

22—Montre	8 feet.	27—Cordedain, a kind of flaut traverse, of metal	4 feet.
23—Viola de Gamba....	8 feet.		
24—Bourdon, metal	8 feet tone.		
25—Salicional	8 feet tone.	28—Trompette.....	8 feet.
26—Flute.....	4 feet.	29—Bassoon.....	8 feet.

Pedal, 7 Stops.

30—Principal, wood .. .	16 feet.	34—Bombarde, wood ...	16 feet.
31—Octave.....	8 feet.	35—Trompette, metal...	8 feet.
32—Quint.....	6 feet.	36—Clairon, metal	4 feet.
33—Prestant.....	4 feet.		

Compass.

Manuals, CC to c^3 in alt, 49 notes. | Pedal, CCC to tenor c, 25 notes.

The Echo and Choir Manuals move and couple to Great.

36. Strasbourg.

The Organ in the Protestant Church, called the "Temple neuf," is also the work of Silberman. Like the last, it is an excellent instrument throughout; but is especially remarkable for the beauty of its Diapasons and Metal Flutes, which are of great excellence. It has 46 Stops, 3 Manuals, and Pedal. The specification is as follows:

Great, 14 Stops.

1—Bourdon.....	16 feet tone.	9—Tierce.....	$1\frac{3}{5}$ foot.
2—Montre	8 feet.	10—Fourniture, III ranks,	1 foot
3—Bourdon.....	8 feet tone.	11—Cymbal .. III ranks,	2 feet.
4—Quintaton	8 feet.	12—Cornet .... V ranks.	
5—Prestant.....	4 feet.	13 Trompete, discant .. / Trompete, basse	8 feet.
6—Flute.....	4 feet tone.		
7—Quint.....	$2\frac{2}{3}$ feet.	14 Clairon, discant .... / Clairon, basse	4 feet.
8—Doublette	2 feet.		

Choir, 10 Stops.

15—Bourdon.....	8 feet tone.	20—Doublette.....	2 feet.
16—Salicional	8 feet.	21—Larigo	$1\frac{1}{3}$ foot.
17—Prestant.....	4 feet.	22—Hautbois, discant...	8 feet.
18—Flute.....	4 feet tone.	23—Cromorne	8 feet.
19—Jeu celeste.....	4 feet.	24—Cor de basset.....	8 feet.

Echo, 13 Stops.

25—Bourdon.....	16 feet tone.	32—Sifflute	1 foot.
26—Montre.....	8 feet.	33—Fourniture, III ranks.	
27—Bourdon.....	8 feet tone.	34—Cornet.... IV ranks.	
28—Viol di Gamba	8 feet.	35—Trompete	8 feet.
29—Prestant.....	4 feet.	36—Bassoon.....	8 feet.
30—Flute.....	4 feet tone.	37—Voix Humana	8 feet.
31—Doublette	2 feet.		

Pedal, 9 Stops.

38—Principal, wood	16 feet.	43—Plein jeu, II ranks.	
39—Bourdon (open wood)	16 feet.	44—Bombarde, metal	16 feet.
40—Octave	8 feet.	45—Trompete, metal	8 feet.
41—Violoncello	8 feet.	46—Clairon .. metal	4 feet.
42—Prestant	4 feet.		

37. Friburg in Brisgau.

The Cathedral of Friburg, in Brisgau, so long celebrated for its beautiful Gothic Spire, contains two Organs, both of which are small, but of remarkably sweet and full tone. The one in the Nave is very old, having been put up in 1520; that in the Choir, which is about the same size, was built in 1811. The nave Organ has 24 Stops, 2 Manuals, and Pedal, of which the following are the particulars:

Great, 10 Stops.

1—Bourdon	16 feet tone.	6—Nazard	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	7—Super-octav	2 feet.
3—Bourdon	8 feet tone.	8—Mixtur, III ranks.	
4—Octav	4 feet.	9—Cymbal, III ranks.	
5—Floete	4 feet tone.	10—Trompete	8 feet.

Choir, 10 Stops.

11—Principal	8 feet.	16—Flote	4 feet.
12—Bourdon	8 feet tone.	17—Waldflote	2 feet.
13—Salicional	8 feet.	18—Sesquialtra, II ranks	$2\frac{2}{3}$ feet.
14—Gamba	8 feet.	19—Cromhorn	8 feet tone.
15—Octav	4 feet.	20—Vox Humana	8 feet tone.

Pedal, 4 Stops.

21—Montre	16 feet.	23—Octav	8 feet.
22—Bourdon	16 feet tone.	24—Posaune, to FFF ..	16 feet.

Compass.

Manual, CC, short octave, up to a^2 in alt.	Pedal, CCC to CC, one octave complete.

38. Friburg in Brisgau.

The Organ in the Lutheran Church at Friburg in Brisgau, was built about 300 years ago, but has lately been repaired. It has 2 Manuals and Pedal, and 32 Stops, of which the following is a list:

Great, 14 Stops.

1—Bourdon	16 feet tone.	8—Quint	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	9—Super-octave	2 feet.
3—Hohlflote	8 feet.	10—Waldflote	2 feet.
4—Bourdon	8 feet tone.	11—Cymbal, III ranks.	
5—Octav	4 feet.	12—Mixtur, II ranks.	
6—Flote	4 feet.	13—Cornet, V ranks.	
7—Fugara	4 feet.	14—Trompete	8 feet.

Choir, 10 Stops.

15—Principal.....	8 feet.	20—Gemshorn.....	4 feet.
16—Bourdon.....	8 feet tone.	21—Flote.....	4 feet.
17—Gamba.....	8 feet.	22—Rohrflote.....	4 feet tone.
18—Salicional.....	8 feet.	23—Superoctav.....	2 feet.
19—Octav.....	4 feet.	24—Trompete.....	8 feet.

Pedal, 8 Stops.

25—Montre.....	16 feet.	29—Bourdon.....	8 feet tone.
26—Bourdon.....	16 feet tone.	30—Mixtur, III ranks.	
27—Quintaton.....	16 feet tone.	31—Posaune.....	16 feet.
28—Principal.....	8 feet.	32—Trompete.....	8 feet.

Compass.	Coupler.
Manuals, CC to f^3 in alt, 54 notes. Pedal, CCC to Gamut G, $1\frac{1}{2}$ octave.	Choir to Great.

39. Frankfort.

The Organ in the Cathedral at Frankfort was built in the early part of the seventeenth century, by Meyer; who also repaired the Cathedral Organ at Ulm, in 1630. The tone of the full Organ is particularly mellow, resonant, and ringing; and there is good weight and fullness of tone on the Pedal. It contains 34 Stops, of which the following is a list:

Great Organ, 14 Stops.

1—Gross Gedackt (Bourdon).....	16 feet tone.	8—Gemshorn.....	4 feet.
2—Principal.....	8 feet.	9—Hohlflöte.....	4 feet.
3—Salicional.....	8 feet.	10—Quint.....	$2\frac{2}{3}$ feet.
4—Viola di Gamba...	8 feet.	11—Octave.....	2 feet.
5—Bifaro.....	8 feet.	12—Mixture, V ranks.	
6—Octave.....	4 feet.	13—Cornet, V ranks.	
7—Klein Flöte.....	4 feet.	14—Trompete.....	8 feet.

Choir Organ, 12 Stops.

15—Principal.....	8 feet.	21—Quint.....	$2\frac{2}{3}$ feet.
16—Flöte Major.....	8 feet.	22—Octave.....	2 feet.
17—Octave.....	4 feet.	23—Sesquialtera, II rks.	$2\frac{2}{3}$ feet.
18—Flöte Minor.....	4 feet.	24—Nazard.....	$1\frac{1}{3}$ foot.
19—Salicional-octave...	4 feet.	25—Vox Humana.....	8 feet.
20—Spitzflöte.....	4 feet.	26—Krumhorn.....	8 feet.

Pedal Organ, 8 Stops.

27—Subbass, metal....	16 feet.	31—Mixtur, III ranks.	
28—Principal Bass, wood,	16 feet.	32—Posaune.....	16 feet.
29—Principal.....	8 feet.	33—Trompete.....	8 feet.
30—Violone.....	8 feet.	34—Clarin.....	4 feet.

Compass.	
Manuals, CC to c^3 in alt, 4 octaves.	Pedal CCC to CC, 1 octave.

40. Frankfort.

The very large and fine new Organ in St. Paul's Church, Frankfort, was built by Walker, of Ludwigsburg. It contains 74 Stops, 3 Manuals, and 2 Pedals, and 12 Bellows 14 feet long by $5\frac{1}{2}$ broad. The Draw-stops are placed over as well as at the sides of the Manuals. The quality and varied tones of the numerous 16, 8, and 4 feet Manual Flue Stops, are deserving of all praise. The following is an enumeration of the Stops in this Organ:

Great, 23 Stops.

1—Manual-untersaz	32 feet tone.	13—Gemshorn-terz	$3\frac{1}{5}$ feet.
2—Principal, in front	16 feet.	14—Quinte	$2\frac{2}{3}$ feet.
3—Gamba major	16 feet.	15—Superoctave, II ranks	2 feet.
4—Tibia major	16 feet.	16—Waldflote	2 feet.
5—Octave	8 feet.	17—Terz-discant	$1\frac{3}{5}$ foot.
6—Viola di Gamba	8 feet.	18—Klein-octave	1 foot.
7—Gemshorn	8 feet.	19—Mixtur, IV ranks.	
8—Jubal Flote, 2 mouths	8 feet.	20—Scharf, V ranks.	
9—Quint	$5\frac{1}{3}$ feet.	21—Cornet, V ranks.	
10—Octave	4 feet.	22—Tuba	16 feet.
11—Hohlpfeife	4 feet.	23—Trompet	8 feet.
12—Fugara	4 feet.		

Choir, 15 Stops.

24—Bordun	16 feet tone.	32—Flauto Traverso	4 feet.
25—Principal, in front	8 feet.	33—Rohrflote	4 feet tone.
26—Salicional	8 feet.	34—Gemshornquint	$2\frac{2}{3}$ feet.
27—Dolce	8 feet.	35—Octave	2 feet.
28—Gedact	8 feet tone.	36—Mixtur, V ranks	2 feet.
29—Quintaton	8 feet tone.	37—Posaune	8 feet.
30—Quintflote	$5\frac{1}{3}$ feet tone.	38—Vox Humana	8 feet.
31—Octave	4 feet.		

Echo, 14 Stops.

39—Quintaton	16 feet tone.	46—Dolcissimo	4 feet.
40—Principal	8 feet.	47—Flute d'amour	4 feet.
41—Harmonica	8 feet.	48—Gedact	4 feet tone.
42—Bifaro	8 feet.	49—Nazard	2_2 feet.
43—Hohlflote	8 feet.	50—Flautino	2 feet.
44—Gedact, two mouths,	8 feet tone.	51—Hautbois	8 feet.
45—Spitzflote	4 feet.	52—Physharmonica	8 feet.

First Pedal, 15 Stops.

53—Contra-bass, open	32 feet.	61—Terz	$6\frac{2}{5}$ feet.
54—Subbass, open	32 feet.	62—Quint	$5\frac{1}{3}$ feet.
55—Principal-bass, in front	16 feet.	63—Octave	4 feet.
56—Octav-bass	16 feet.	64—Posaune	16 feet.
57—Violon	16 feet.	65—Trompete	8 feet.
58—Quint	$10\frac{2}{3}$ feet.	66—Clarino	4 feet.
59—Octave	8 feet.	67—Cornettino	2 feet.
60—Violoncello	8 feet.		

Second Pedal, 7 Stops.

68—Subbass	16 feet tone.	72—Flote	4 feet.
69—Violon d'amour	16 feet.	73—Waldflote	2 feet.
70—Principal	8 feet.	74—Fagotto	16 feet.
71—Flote	8 feet.		

Accessory Stops, Movements, &c.

1—Choir to Great.
2—Echo to Choir.
3—Great to first Pedal.
4—Choir to second Pedal.
5—Second to first Pedal.
6, 7, 8, 9, 10—Five Wind-trunk Valves.

Compass.

Manuals, CC to f^3 in alt, 54 keys. | Pedal, CCC to tenor d, 27 keys.

41. Fulda.

The Organ in the Town Church at Fulda has 48 Sounding Stops, 3 Manuals, and Pedal of 9 Stops. The following is its disposition:

Great, 15 Stops.

Large Scale and full intonation.

1—Principal, tin, the 16 feet octave in front	16 feet.	11—Octave, II ranks, tin	2 feet & 1ft.
2—Bourdon, wood....	16 feet tone.	12—Mixtur, IV ranks, c, e, g, c	2 feet.
3—Principal, tin in front	8 feet.	13—Cymbal, III ranks, g, c, g	1⅓ foot.
4—Bourdon, wood....	8 feet tone.	14—Cornet, III ranks, the first and second ranks, wood stopped, c, g, c	8 feet tone.
5—Hohlflote, wood....	8 feet.		
6—Quint, wood bass, tin treble.....	5⅓ feet.		
7—Gamba Quint.....	5⅓ feet.		
8—Octave, tin.....	4 feet.	15—Trompete, tin, with free reeds.....	8 feet.
9—Hohlflote, wood....	4 feet.		
10—Quint, tin.....	2⅔ feet.		

Choir, 12 Stops.

Smaller Scale and clear intonation.

16—Principal, the bass and tenor octaves of wood, the treble of tin.....	16 feet.	20—Quintaton, tin....	8 feet tone
		21—Octave, tin.....	4 feet.
		22—Flote, wood.....	4 feet.
		23—Klein Gedact, tin..	4 feet tone.
17—Principal, tin in front	8 feet.	24—Waldflote, tin	4 feet.
18—Gemshorn, the bass and tenor octaves of wood, the treble of tin.....	8 feet.	25—Quint, tin.....	2⅔ feet.
		26—Octave, II ranks, tin,	2 feet & 1 foot.
		27—Mixtur, IV ranks, tin, c, e, g, c...	2 feet.
19—Still-gedact, wood..	8 feet tone.		

Echo, 12 Stops.

Smallest Scale and delicate intonation.

28—Quintaton, the bass octave of wood, the remainder of tin..	16 feet tone.	33—Octave, tin.....	4 feet.
		34—Spitzflote, tin	4 feet.
		35—Flote travers, wood .	4 feet.
29—Geigen Principal, tin, in front.....	8 feet.	36—Flageolet, tin.....	2 feet.
		37—Sifflote, tin.....	1 foot.
30—Salicional.....	8 feet.	38—Mixtur, III ranks, tin, c, g, c	2 feet.
31—Gedact, wood	8 feet tone.		
32—Flote travers, wood .	8 feet.	39—Clavioline.....	8 feet.

Pedal, 9 Stops.

Largest Scale and fullest intonation.

40—Untersatz, wood . . . 32 feet tone.	45—Octaven-bass, wood . 8 feet.
41—Principal-bass, wood 16 feet.	46—Violoncello, wood . . 8 feet.
42—Violon, wood . . . . . 16 feet.	47—Traversen-bass . . . . 8 feet.
43—Sub-bass, wood . . . . 16 feet tone.	48—Posaune, wooden tubes . . . . . 16 feet.
44—Traversen-bass, wood 16 feet.	

Accessory Stops, Movements, &c.

1—Coupler Choir to Great.	5—Tremulant.
2—Coupler Echo to Great.	6, 7, 8, 9—Four double-action composition Pedals, one to each manual.
3—Coupler Great to Pedal.	
4—Coupler Choir to Pedal.	

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to tenor d, 27 notes.

42. Gotha.

The Organ in St. Augustine's Church, at Gotha, was built in 1841, by Schulze, and contains 34 Stops, of which the following is a list:

Great, 15 Stops.

1—Bourdon to fiddle g . 32 feet tone.	6—Hohlflote . . . . . 8 feet.
2—Principal; bass and tenor octaves of wood; from middle c^1 upwards, of tin 16 feet.	7—Octave . . . . . 4 feet.
	8—Hohlflote . . . . . 4 feet.
	9—Gedact . . . . . 4 feet tone.
3—Bourdon . . . . . 16 feet tone.	10—Quint . . . . . $2\frac{2}{3}$ feet.
4—Octave; bass octave of wood; from tenor c upwards, of tin . . . . . 8 feet.	11—Octave . . . . . 2 and 1.
	12—Mixtur, V ranks . . 2 feet.
	13—Cymbal, III ranks . 2 feet.
	14—Cornet, III ranks.
5—Gamba . . . . . 8 feet.	15—Trompet . . . . . 8 feet.

Choir, 11 Stops.

16—Leiblich Gedact . . . . 16 feet tone.	21—Leiblich Gedact . . . 8 feet tone.
17—Geigen Principal; bass octave of wood . . 8 feet.	22—Octave . . . . . 4 feet.
	23—Flaut douce . . . . . 4 feet.
18—Salicional . . . . . 8 feet.	24—Quinte . . . . . $2\frac{2}{3}$ feet.
19—Flauto Traverso . . . 8 feet.	25—Octave . . . . . 2 feet.
20—Harmonica . . . . . 8 feet.	26—Scharf, III ranks . . 2 feet.

Pedal, 8 Stops.

27—Principalbass . . . . . 16 feet.	31—Violoncello . . . . . 8 feet.
28—Violonbass . . . . . 16 feet.	32—Gedactbass . . . . . 8 feet tone.
29—Subbass . . . . . 16 feet tone.	33—Posaune . . . . . 32 feet.
30—Octavebass . . . . . 8 feet.	34—Posaune . . . . . 16 feet.

43. Gotha.

The Organ in the Church of St. Margaret, at Gotha, was also built by Schulze It contains 26 Stops, distributed as follows:

Great or Lower Manual, 13 Stops.

1—Principal	16 feet.	8—Quint, Stopped wood	$5\frac{1}{3}$ feet.
2—Bourdon	16 feet tone.	9—Octave	4 feet.
3—Principal	8 feet.	10—Flote	4 feet.
4—Gamba	8 feet.	11 { Quint	$2\frac{2}{3}$ feet.
5—Hohlflote	8 feet.	11 { Octave	2 feet.
6—Gedact	8 feet tone.	12—Mixture, V ranks	2 feet.
7—Harmonica	8 feet.	13—Scharf, III ranks	2 feet.

Choir or Upper Manual, 7 Stops.

14—Leiblich Gedact	16 feet tone.	18—Flauto Traverso	8 feet.
15—Geigen Principal	8 feet.	19—Principal	4 feet.
16—Salicional	8 feet.	20—Flauto Traverso	4 feet.
17—Leiblich Gedact	8 feet tone.		

Pedal, 6 Stops.

21—Principal-bass	16 feet.	24—Octavenbass	8 feet.
22—Violon	16 feet.	25—Violoncello	8 feet.
23—Sub-bass	16 feet tone.	26—Posaune	16 feet.

44. Haarhausen.

The Organ in the Church at Haarhausen, in the Dukedom of Gotha, has 2 Manuals and Pedal, and 22 Stops. The following is its disposition:

Great, 10 Stops.

1—Quintaton	16 feet tone.	6—Octave	4 feet.
2—Principal, Eng. tin	8 feet.	7—Quinta	$2\frac{2}{3}$ feet.
3—Gedact	8 feet tone.	8—Superoctave	2 feet.
4—Gamba	8 feet.	9—Mixtur, IV ranks	2 feet.
5—Hohlflote, of wood	8 feet.	10—Cymbel, III ranks	1 foot.

Choir, 8 Stops.

11—Flote, to tenor c	8 feet.	15—Nachthorn	4 feet.
12—Stillgedact	8 feet tone.	16—Octave	2 feet.
13—Quintaton	8 feet tone.	17—Sesquialter, II ranks	$2\frac{2}{3}$ feet.
14—Principal, Eng. tin	4 feet.	18—Mixtur, IV ranks	1 foot.

Pedal, 4 Stops.

19—Violonbass	16 feet.	21—Octavenbass	8 feet.
20—Subbass	16 feet tone.	22—Posaunenbass.	16 feet.

Accessory Stops, &c.

1—Choir to Great.	3, 4, 5—Three Wind-trunk Valves.
2—Great to Pedal.	

45. Eltsleben.

The Organ in the Church at Eltsleben, in the Princedom of Schwartzburg, was built by Francis Volkland. It has 2 Manuals and Pedal, and 28 Stops, the names and distribution of which latter are as follow:

Great, 12 Stops.

1—Quintaton	16 feet tone.	7—Quinta	$2\frac{2}{3}$ feet.
2—Principal, Eng. tin	8 feet.	8—Superoctave	2 feet.
3—Bordun	8 feet tone.	9—Sesquialter, II ranks	$2\frac{2}{3}$ feet.
4—Gamba	8 feet.	10—Mixtur, VI ranks	2 feet.
5—Flauto Traverso	8 feet.	11—Cymbel, IV ranks	1 foot.
6—Octave	4 feet.	12—Trompete	8 feet.

Choir, 10 Stops.

13—Gedact	8 feet tone.	18—Hohlflöte	4 feet.
14—Quintaton	8 feet tone.	19—Octave	2 feet.
15—Principal, Engl, tin	4 feet.	20—Sesquialter, II ranks	$2\frac{2}{3}$ feet.
16—Nachthorn	4 feet.	21—Mixture, IV ranks	$1\frac{1}{3}$ foot.
17—Spitzflöte	4 feet.	22—Vox Humana	8 feet tone.

Pedal, 6 Stops.

23—Violon-bass	16 feet.	26—Violon-bass	8 feet.
24—Sub-bass	16 feet tone.	27—Hohlflöten-bass	4 feet.
25—Octaven-bass	8 feet.	28—Posaunen-bass	16 feet.

Accessory Stops, Movements, &c.

1—Coupler Choir to Great.
2—Coupler Great to Pedal.
3—Tremulant to Choir.
4, 5, 6—Three Wind-trunk-valves to Manuals and Pedal.
7—Cymbelstern, g, h, d, g.
8—Cymbelstern, c, e, g, c.

46. Waltershausen.

The fine Organ at Waltershausen, in the Dukedom of Gotha, contains 3 Manuals and Pedal, and 50 Sounding-Stops; the names and distribution of which latter are as follow:

Great, 17 Stops.

1—Bordun	16 feet tone.	9—Octave	4 feet.
2—Quintaton	16 feet tone.	10—Rohrflote	4 feet tone.
3—Praestant, Engl. tin, in front	8 feet.	11—Salcional	4 feet.
4—Bordun	8 feet tone.	12—Quinta	$2\frac{2}{3}$ feet.
5—Gamba	8 feet.	13—Superoctave	2 feet.
6—Gemshorn	8 feet.	14—Sesquialter, II ranks	$2\frac{2}{3}$ feet.
7—Quintaton	8 feet tone.	15—Mixtur, VIII ranks.	2 feet.
8—Unta Maris	8 feet tone.	16—Fagott	16 feet.
		17—Trompete	8 feet.

Choir, 12 Stops.

18—Spitzflote Major	8 feet.	24—Gemshorn quinta	$2\frac{2}{3}$ feet.
19—Nachthorn	8 feet.	25—Nasat	$2\frac{2}{3}$ feet.
20—Principal, Engl. tin, in front	4 feet.	26—Octave	2 feet.
21—Quintaton	4 feet tone.	27—Sesquialter	$1\frac{3}{5}$ foot.
22—Gemshorn	4 feet.	28—Mixtur, IV ranks	$2\frac{2}{3}$ feet.
23—Flauto douce	4 feet.	29—Hautbois	8 feet.

Echo, 7 Stops.

30—Geigen-Principal, Engl. tin, in front.. 8 feet.
31—Doppel-Flute. . . . . 8 feet.
32—Hohlflote. . . . . 8 feet.
33—Flauto Traverso. . . . 8 feet.
34—Spitzflote. . . . . 4 feet.
35—Still-Gedact. . . . . 4 feet tone.
36—Hohlflote. . . . . 2 feet.

Pedal, 14 Stops.

37—Gross-Untersatz. . . 32 feet tone.
38—Gross-Principal, Engl. tin, in front. . . . . 16 feet.
39—Quintaton. . . . . 16 feet tone.
40—Violon. . . . . 16 feet.
41—Untersatz. . . . . 16 feet tone.
42—Octaven-Principal . . 8 feet.
43—Bordun. . . . . 8 feet tone.
44—Viola di Gamba. . . . 8 feet.
45—Quinta. . . . . $5\frac{1}{3}$ feet.
46—Octave. . . . . 4 feet.
47—Rohrflote. . . . . 4 feet tone.
48—Mixtur. . . . . 2 feet.
49—Posaune. . . . . 16 feet.
50—Trompete. . . . . 8 feet.

Accessory Stops, Movements, &c.

1—Coupler Choir to Great.
2—Coupler Echo to Great.
3—Coupler Great to Pedal.
4—Tremulant to Choir.
5—Cymbelstern.
6, 7, 8, 9—Four Wind-valves.

47. Zerbst.

The new Organ in the Church of St. Nicholas, Zerbst, was built by Zuberbier and his partner Geibelin in 1840. It contains 37 Stops, 2 Manuals, and a Pedal of 9 Stops. The details of the instrument are as follow:

Great, 15 Stops.

1—Principal, in front . . 16 feet.
2—Quintaton . . . . . 16 feet tone.
3—Octave. . . . . 8 feet.
4—Gedact. . . . . 8 feet tone.
5—Viola di Gamba. . . . 8 feet.
6—Hohlflote. . . . . 8 feet.
7—Quinta. . . . . $5\frac{1}{3}$ feet.
8—Super Octave. . . . . 4 feet.
9—Gedact. . . . . 4 feet tone.
10—Gemshorn. . . . . 4 feet.
11—Quinta. . . . . $2\frac{2}{3}$ feet.
12—Quinta decima . . . . 2 feet.
13—Mixtur, VI ranks.
14—Cornett, IV ranks.
15—Trompete. . . . . 8 feet.

Choir, 13 Stops.

16—Bordun. . . . . 16 feet tone.
17—Principal. . . . . 8 feet.
18—Gedact. . . . . 8 feet tone.
19—Quintaton . . . . . 8 feet tone.
20—Flauto traverso. . . . 8 feet.
21—Octave. . . . . 4 feet.
22—Salicet. . . . . 4 feet.
23—Flaut douce. . . . . 4 feet.
24—Quint. . . . . $2\frac{2}{3}$ feet.
25—Superoctave. . . . . 2 feet.
26—Waldflote. . . . . 2 feet.
27—Tertia. . . . . $1\frac{3}{5}$ foot.
28—Mixtur, IV ranks . . $2\frac{2}{3}$ feet.

Pedal, 9 Stops.

29—Untersaz. . . . . 32 feet tone.
30—Principal, in front . . 16 feet.
31—Subbass. . . . . 16 feet tone.
32—Violone. . . . . 16 feet.
33—Octave. . . . . 8 feet.
34—Violoncello. . . . . 8 feet.
35—Superoctave. . . . . 4 feet.
36—Posaune. . . . . 16 feet.
37—Trompete. . . . . 8 feet.

Accessory Stops, Movements, &c.

1—Coupler Great to Pedal.
2, 3, 4—Three Wind-trunk-valves. Six Bellows, 10 feet by 5.

48. Langensulza.

The new Organ in the Church of St. Boniface, at Langensulza, contains 34 Stops, distributed among 2 Manuals and Pedal in the following manner:

Great, 14 Stops.

1—Bordun, of wood	16 feet tone.	8—Spitzflote	4 feet.
2—Principal, of Engl. tin	8 feet.	9—Quinta	2⅔ feet.
3—Bordun	8 feet tone.	10—Superoctave	2 feet.
4—Gemshorn	8 feet.	11—Mixtur, VI ranks	2 feet.
5—Viola di Gamba	8 feet.	12—Cymbel, III ranks	1 foot.
6—Flauto major	8 feet.	13—Cornet, III ranks.	
7—Octave	4 feet.	14—Trompet	8 feet.

Choir, 13 Stops.

15—Quintaton	16 feet tone.	21—Flach-flote, pear-tree wood	4 feet.
16—Principal, of Engl. tin	8 feet.	22—Octave, metal	2 feet.
17—Gedact, wood	8 feet tone.	23—Sesquialtera, II ranks	2⅔ feet.
18—Flauto Traverso, pear-tree wood	8 feet.	24—Mixture, IV ranks	2 feet.
19—Kleingedact, metal	4 feet tone.	25—Scharf, IV ranks	1 foot.
20—Nachthorn	4 feet.	26—Cymbel, III ranks	½ foot.
		27—Vox Humana	8 feet tone.

Pedal, 7 Stops.

28—Gross-Untersatz, wood	32 feet tone.	31—Sub-bass, wood	16 feet tone.
29—Principal-bass, wood	16 feet.	32—Traversen-bass, wood	16 feet.
30—Violon-bass, wood	16 feet.	33—Octaven-bass, wood	8 feet.
		34—Posaun-bass, wood	16 feet.

Accessory Stops, Movements, &c.

1—Coupler Choir to Great.
2—Coupler Great to Pedal.
3—Coupler Choir to Pedal.
4—Tremulant to Choir.
5, 6, 7—Three Wind-trunk-valves.
8—Cymbelstern.

49. Muhlhausen.

The Organ at the Church at Muhlhausen has 60 Sounding-Stops, 3 Manuals and Pedal. The following is a list of the Stops:

Great, 15 Stops.

1—Bordun	16 feet tone.	9—Superoctave	2 feet.
2—Surdun	16 feet tone.	10—Waldhorn	2 feet.
3—Principal	8 feet.	11—Sexte	2⅔ feet.
4—Spitzflote	8 feet.	12—Sifflote	1 foot.
5—Salcional	8 feet.	13—Mixtur, VII & VIII ranks.	
6—Octave	4 feet.	14—Mixtur, VI ranks.	
7—Offeneflote	4 feet.	15—Zink (reed)	8 feet.
8—Quint	2⅔ feet.		

Choir, 14 Stops.

16—Principal	8 feet.	23—Superoctave	2 feet.
17—Gedact	8 feet tone.	24—Gemshorn	2 feet.
18—Quintaton	8 feet tone.	25—Tertian	2 feet.
19—Hohlflote	4 feet.	26—Sifflote	1 foot.
20—Quintaton	4 feet tone.	27—Mixtur, VI ranks.	
21—Querflote	4 feet.	28—Dulcian	16 feet.
22—Quint	2⅔ feet.	29—Krummhorn	8 feet tone.

Echo, 13 Stops.

30—Salcional..... 16 feet.
31—Principal..... 8 feet.
32—Viol di Gamba.... 8 feet.
33—Hohlflote..... 8 feet.
34—Spitzflote..... 4 feet.
35—Flote douce..... 4 feet.
36—Quinte..... $2\frac{2}{3}$ feet.
37—Waldflote..... 2 feet.
38—Tertia..... 2 feet.
39—Cymbal, IV ranks.
40—Harfen-regal..... 16 feet.
41—Hautbois..... 8 feet.
42—Trompete..... 4 feet.

Pedal, 18 Stops.

43—Subbass..... 32 feet tone.
44—Principal..... 16 feet.
45—Sub-bass..... 16 feet tone.
46—Octave..... 8 feet.
47—Waldflote..... 8 feet.
48—Octave..... 4 feet.
49—Quintaton..... 4 feet tone.
50—Nachthorn..... 4 feet.
51—Superoctave..... 2 feet.
52—Super-superoctave.. 1 foot.
53—Mixtur, X ranks.
54—Posaune..... 32 feet.
55—Posaune..... 16 feet.
56—Dulcian..... 16 feet.
57—Trompete..... 8 feet.
58—Krummhorn..... 8 feet tone.
59—Schalmei..... 4 feet tone.
60—Cornet..... 2 feet.

50. Merseburg.

The Cathedral Organ at Merseburg, in Saxony, has 75 Stops, 62 of which are whole ones. It has 4 Manuals and a Pedal of 17 Stops, and 6 large Bellows. The following is an enumeration of the whole Stops:

Great, 14 Stops.

1—Rohrflote..... 16 feet tone.
2—Quintadena..... 16 feet tone.
3—Principal..... 8 feet.
4—Quintadena..... 8 feet tone.
5—Quint..... $5\frac{1}{3}$ feet.
6—Octave..... 4 feet.
7—Flute..... 4 feet tone.
8—Octave..... 2 feet.
9—Sesquialtera, II ranks $2\frac{2}{3}$ feet.
10—Mixture, VI ranks.
11—Cymbal, III ranks.
12—Bombarde..... 16 feet.
13—Trompette..... 8 feet.
14—Chalmey..... 8 feet tone.

Choir, 13 Stops.

15—Bourdon..... 16 feet tone.
16—Principal..... 8 feet.
17—Rohrflote..... 8 feet tone.
18—Viol di Gamba.... 8 feet.
19—Stahlspiel..... 4 feet.
20—Flageolet..... 4 feet.
21—Nason..... $2\frac{2}{3}$ feet.
22—Octave..... 2 feet.
23—Rohrflote..... 2 feet tone.
24—Tierce..... $1\frac{3}{5}$ foot.
25—Mixture, VI ranks.
26—Vox Humana.... 8 feet tone.
27—Chalmey..... 8 feet tone.

Choir in front, 10 Stops.

28—Quintadena..... 8 feet tone.
29—Gedact..... 8 feet tone.
30—Rohrflote..... 8 feet tone.
31—Principal..... 4 feet.
32—Dulciana..... 4 feet.
33—Flute..... 4 feet.
34—Rohrflote..... 4 feet tone.
35—Quint..... $2\frac{2}{3}$ feet.
36—Terz..... 2 feet.
37—Flageolet..... 2 feet.

Echo, 8 Stops.

38—Bourdon..... 8 feet tone.
39—Principal..... 4 feet.
40—Salicional..... 4 feet.
41—Nason..... $2\frac{2}{3}$ feet.
42—Octave..... 2 feet.
43—Tierce..... $1\frac{3}{5}$ foot.
44—Octave..... 1 foot.
45—Mixture, IV ranks.

Pedal, 17 Stops.

45—Subbass	32 feet tone.	54—Flute	4 feet.
46—Principal	16 feet.	55—Flageolet	2 feet.
47—Violone	16 feet.	56—Flute octave	1 foot.
48—Subbass	16 feet tone.	57—Mixture, VI ranks.	
49—Principal	8 feet.	58—Trombone	32 feet.
50—Violoncello	8 feet.	59—Trombone	16 feet.
51—Klein Subbass	8 feet tone.	60—Trompete	8 feet.
52—Quint	$5\frac{1}{3}$ feet.	61—Cornet	4 feet.
53—Octave	4 feet.		

51. Halle.

The Organ in the Church of St. Maurice, at Halle, built by Schulze, contains 40 Stops, distributed between 3 Manuals and Pedal. The Sound-boards are made to slope upwards from front to back, so that the Stops stand in terrace form.

Great, 14 Stops.

1—Bordun to g	32 feet tone.	8—Quinte	$5\frac{1}{3}$ feet.
2—Principal	16 feet.	9—Octave	4 feet.
3—Bordun	16 feet tone.	10—Flote	4 feet.
4—Octave	8 feet.	11—Quint & Octave	$2\frac{2}{3}$ & 2 feet.
5—Gedact	8 feet tone.	12—Mixtur, V ranks	2 feet.
6—Gamba	8 feet.	13—Cornet, III ranks.	
7—Hohlflote	8 feet.	14—Trompete	8 feet.

Choir, 10 Stops.

15—Bordun	16 feet tone.	20—Octave	4 feet.
16—Principal	8 feet.	21—Hohlflote	4 feet.
17—Gedact	8 feet tone.	22—Quinte	$2\frac{2}{3}$ feet.
18—Flote	8 feet.	23—Octave	2 feet.
19—Salicional	8 feet.	24—Scharf, V ranks	2 feet.

Echo, 8 Stops.

25—Leiblich-Gedact	16 feet tone.	29—Harmonica	8 feet.
26—Geigen-Principal	8 feet.	30—Schweizerflote	8 feet.
27—Leiblich-Gedact	8 feet tone.	31—Geigen-Principal	4 feet.
28—Flauto Traverso	8 feet.	32—Gedact	4 feet tone.

Pedal, 8 Stops.

33—Principal Bass	16 feet.	37—Gedactbass	8 feet tone.
34—Subbass	16 feet tone.	38—Violoncello	8 feet.
35—Violone	16 feet.	39—Posaune	32 feet.
36—Octavebass	8 feet.	40—Posaune	16 feet.

52. Loiz.

The Organ in the Marien-Kirche at Loiz, built by Johann Frederic Schulze, has 34 Sounding Stops, 2 Manuals, and Pedal. The following is a list of its contents:

Great, 14 Stops.

1—Bordun to g	32 feet tone.	8—Octave	4 feet.
2—Bordun	16 feet.	9—Gedact-flote	4 feet tone.
3—Principal	8 feet.	10—Quinte	$2\frac{2}{3}$ feet.
4—Gedact	8 feet tone.	11—Octave	2 feet.
5—Gamba	8 feet.	12—Mixture, V ranks	2 feet.
6—Hohlflote	8 feet.	13—Scharf, III ranks	2 feet.
7—Quinte	$5\frac{1}{3}$ feet.	14—Trompete	8 feet.

Choir, 12 Stops.

15—Leiblich-Gedact . . . 16 feet tone.
16—Geigen-Principal. . . 8 feet.
17—Leiblich-Gedact . . . 8 feet tone.
18—Salicional . . . . . 8 feet.
19—Flauto Traverso. . . . 8 feet.
20—Harmonica. . . . . 8 feet.
21—Octave . . . . . 4 feet.
22—Flauto Traverso. . . . 4 feet.
23—Quinte . . . . . $2\frac{2}{3}$ feet.
24—Octave . . . . . 2 feet.
25—Scharf, III ranks . . 2 feet.
26—Æoline . . . . . 8 feet.

Pedal, 8 Stops.

27—Violone . . . . . 16 feet.
28—Sub-bass . . . . . 16 feet tone.
29—Gross-Quinte . . . . . $10\frac{2}{3}$ feet.
30—Octaven-bass . . . . . 8 feet.
31—Gedact . . . . . 8 feet tone.
32—Violoncello . . . . . 8 feet.
33—Posaune . . . . . 32 feet.
34—Posaune . . . . . 16 feet.

Compass.

Manuals, CC to f^3 in alt, 54 tones. | Pedal, CCC to Tenor d, 27 tones.

53. Katscher.

The Organ in the Catholic Church at Katscher was built by Müller, sen. in 1843. It has 21 Sounding Stops, distributed among 2 Manuals and Pedal in the following manner:

Great, 11 Stops.

1—Bourdon...Maple-wood in the Treble, Pine-wood in the Bass . . 16 feet tone.
2—Principal, $\frac{7}{8}$ tin, in front, 8 feet.
3—Salicet ... Maple-wood to Tenor c, the remaining Octave of Pine ..... 8 feet.
4—Doppelrohrflöte ... Oak to middle c^1, Pine for the remaining 2 octaves ..... 8 feet tone.
5—Portunalflaut ..... 8 feet.
6—Principal ..... 4 feet.
7—Doppelrohrflaut ... of Oak..... 4 feet tone.
8—Gemshornquinte, metal, $2\frac{2}{3}$ feet.
9—Super octave, metal... 2 feet.
10—Mixtur...Probetin, V ranks.
11—Trompete ..... 8 feet.

Choir, 6 Stops.

12—Principal...in front ... 8 feet.
13—Salicet...of Probetin in the treble, Pine in the Bass..... 8 feet.
14—Flaut major...Oak in the treble, Pine in the Bass..... 8 feet tone.
15—Salicet ..... 4 feet.
16—Portunal ... of Maple and Pear-tree woods to tenor c; the last octave of Pine..... 4 feet.
17—Violini...14 loth. Probetin ..... 2 feet.

Pedal, 4 Stops.

18—Violon ... of Pine-wood ....,..... 16 feet.
19—Subbass...of Pine-wood ..... 16 feet tone.
20—Violon ... of Pine-wood ..... 8 feet.
21—Posaune ... Peartree-wood ..... 16 feet.

Accessory Stops, &c.

1—Wind to Great.
2—Wind to Choir.
3—Wind to Pedal.

Compass, &c.

Manuals, CC to d^3 in alt.
Pedal, CCC to tenor d.
3 Bellows, 9 feet by $4\frac{1}{2}$.

54. Erdmannsdorf.

The Organ in the Church at Erdmannsdorf was built by Buckow, in 1840; and has 19 Sounding Stops, of which the following is a list:

Great, 9 Stops.

1—Bourdon..wood .... 16 feet tone.
2—Principal..of Eng. tin in front ..... 8 feet.
3—Gemshorn .. 14 loth. tin ..... 8 feet.
4—Principal octave. Eng. tin in front..... 4 feet.
5—Gemshorn .. 14 loth. tin ..... 4 feet.
6—Nasard (conical) 12 loth. tin ..... 3 feet.
7—Super octave. 14 loth. tin ..... 2 feet.
8—Cornetti. 12 loth. tin, of conical pipes .. III ranks ..... 2 feet.
9—Progressio. 14 loth. tin, III and IV ranks.. 2 feet.

Choir, 6 Stops.

10—Salicional..Eng. tin. 8 feet.
11—Viola di Gamba..14 loth. tin ..... 8 feet.
12—Flauto douce. 10 loth. metal, lower octaves of wood ..... 8 feet.
13—Principal..Eng. tin.. 4 feet.
14—Flaut d'amour .. 10 loth metal ..... 4 feet.
15—Flautino .. 12 loth. Probetin .. conical pipes ..... 2 feet.
16—Slider for a Reed Stop of ..... 8 feet.

Pedal, 4 Stops.

17—Violon..wood..... 16 feet.
18—Subbass..wood .... 16 feet tone.
19—Violoncello..the upper notes of Probetin ..... 8 feet.
20—Posaune ..... 16 feet.

Accessory Stops, &c.	Compass.
1—Coupler, Choir to Great.	Manuals, CC to f^3 in alt.
2—Coupler, Great to Pedal.	Pedal, CCC to Tenor d.
3, 4, 5—Three Wind-trunk Valves.	

55. Krumols.

The Organ in the new Catholic Church at Krumols has 22 Sounding Stops, of which the following is a list:

Great, 10 Stops.

1—Bourdon. metal treble, wood bass ..... 16 feet tone.
2—Principal .. Eng. tin, polished, and in front, 8 feet.
3—Gemshorn .. 14 loth. English tin..... 8 feet.
4—Hohlflöte..the upper $3\frac{1}{2}$ octave in 10 loth. metal, the remainder of wood .... 8 feet.
5—Octave..12 loth. Eng. tin ..... 4 feet.
6—Gemshorn .. 12 loth. English tin..... 4 feet.
7—Quinte..12 loth. Eng. tin ..... $2\frac{2}{3}$ feet.
8—Super octave .. 12 loth. English tin .. 2 feet.
9—Progressio .. 12 loth. Eng. tin..III, IV, and V ranks .... 2 feet.
10—Trompete ..... 8 feet.

Choir, 8 Stops.

11—Viola di Gamba . . 15 loth. English tin . . 8 feet.
12—Flaut douce . . 10 loth. metal to tenor c, last octave wood . . 8 feet.
13—Principal . . 14 loth. Eng. tin, in front . 4 feet.
14—Flût d'amour . . 10 loth. metal . . . . . 4 feet.
15—Quinta dulcis . . . . . $2\frac{2}{3}$ feet.
16—Flautino . . 12 loth. Eng. tin . . . . . 2 feet
17—Flauto Piccolo . . 12 loth. Eng. tin . . . . 1 foot.
18—Cornetti . . 12 loth. Eng. tin, III ranks.

Pedal, 4 Stops.

19—Principal . . wood . . . . 16 feet.
20—Subbass . . wood . . . . 16 feet tone.
21—Octave . . 12 loth. tin . 8 feet.
22—Posaune . . . . . 16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Choir to Great.
2—Coupler, Great to Pedal.
3, 4, 5—Three Wind-trunk Valves.

Compass, &c.

Manuals, CC to f^3 in alt.
Pedal, CCC to tenor d.
Three Bellows, 10 feet long.

56. Halberstadt.

The Organ in the Great Church at Halberstadt was built by J. F. Schulze, and is remarkable for having a 32-feet Reed on the Manual. This instrument has 65 Sounding Stops, and about 4250 Pipes. There are 4 Manuals, and a Pedal Organ of 18 Stops. The Specification of the Stops is as follow:

First Manual, 15 Stops.

1—Principal . . . . . 16 feet.
2—Octave . . . . . 8 feet.
3—Gemshorn . . . . . 8 feet.
4—Gedact . . . . . 8 feet tone.
5—Nasat . . . . . $5\frac{1}{3}$ feet.
6—Octave . . . . . 4 feet.
7—Gedact . . . . . 4 feet tone.
8—Quinte . . . . . $2\frac{2}{3}$ feet.
9—Octave . . . . . 2 feet.
10—Mixtur . . VI ranks.
11—Scharf . . . IV ranks.
12—Cornett . . IV ranks.
13—Contrafagott . . . . . 32 feet.
14—Trompete . . . . . 16 feet.
15—Trompete . . . . . 8 feet.

Second Manual, 13 Stops.

16—Gedact . . . . . 16 feet tone.
17—Quintaton . . . . . 16 feet.
18—Principal . . . . . 8 feet.
19—Viola di Gamba . . . . 8 feet.
20—Hohlflöte . . . . . 8 feet.
21—Gedact . . . . . 8 feet tone.
22—Octave . . . . . 4 feet.
23—Flute douce . . . . . 4 feet.
24—Quinte . . . . . $2\frac{2}{3}$ feet.
25—Octave . . . . . 2 feet.
26—Mixtur . . . . V ranks.
27—Cymbel . . III ranks.
28—Hautbois . . . . . 8 feet.

Third Manual, 11 Stops.

29—Bourdon . . . . . 16 feet tone.
30—Principal . . . . . 8 feet.
31—Salcional . . . . . 8 feet.
32—Gedact . . . . . 8 feet tone.
33—Octave . . . . . 4 feet.
34—Spitzflöte . . . . . 4 feet.
35—Nasat . . . . . $2\frac{2}{3}$ feet.
36—Octave . . . . . 2 feet.
37—Mixtur . . IV ranks.
38—Cornett . . III ranks.
39—Vox Humana . . . . . 8 feet tone.

Fourth Manual, 8 Stops.

40—Lieblich Gedact	16 feet tone.	44—Lieblich Gedact	8 feet tone.
41—Terpodion.....	8 feet.	45—Principal	4 feet.
42—Harmonica.....	8 feet.	46—Flauto.....	4 feet.
43—Flauto traverso	8 feet.	47—Physharmonica	8 feet.

Pedal, 18 Stops.

48—Untersatz	32 feet tone.	57—Tertia	$6\frac{2}{3}$ feet.
49—Principal	16 feet.	58—Nasat.....	$5\frac{1}{3}$ feet.
50—Violone.....	16 feet.	59—Octave	4 feet.
51—Subbass	16 feet tone.	60—Mixtur..VI ranks.	
52—Subbass	16 feet.	61—Cornett.. V ranks.	
53—Grossnasat.....	$10\frac{2}{3}$ feet.	62—Posaune	32 feet.
54—Octave	8 feet.	63—Posaune	16 feet.
55—Violoncello	8 feet.	64—Trompete.....	8 feet.
56—Gedact	8 feet tone.	65—Trompete.....	4 feet.

57. Hirschberg.

The large Organ in Christ Church, Hirschberg, has 62 Sounding Stops, 4 Manuals, Pedal of 16 Stops, and 3844 Pipes. The Stops are disposed in the following manner:

First Manual, 16 Stops.

1—Principal..$\frac{3}{4}$ tin....	16 feet.	10—Vigesima secunda . tin	2 feet.
2—Quintaton.. metal ..	16 feet tone.	11—Rauschquinte. II ranks, tin	$1\frac{1}{2}$ foot.
3—Principal . . Eng. tin .	8 feet.	12—Mixtur ..V ranks, tin	2 feet.
4—Gemshorn..metal ..	8 feet.	13—Scharf..IV ranks, tin	$1\frac{1}{3}$ foot.
5—Hohlflöte .. wood ..	8 feet.	14—Cymbel. III ranks, tin	1 foot.
6—Nasard . . tin	$5\frac{1}{3}$ feet.	15—Tromba..$\frac{3}{4}$ tin	16 feet.
7—Super octave . . tin ..	4 feet.	16—Trompete . $\frac{3}{4}$ tin	8 feet.
8—Flute douce..wood..	4 feet.		
9—Quinte..tin	$2\frac{2}{3}$ feet.		

Second Manual, 13 Stops.

17—Bourdon..oak-wood .	16 feet tone.	24—Super octave..tin ..	2 feet.
18—Principal, in front . tin	8 feet.	25—Terz .....tin..	$1\frac{3}{5}$ foot.
19—Gedact . . metal	8 feet tone.	26—Flageolet .....tin..	1 foot.
20—Quintaton..metal ..	8 feet tone.	27—Mixtur . VI ranks, tin	2 feet.
21—Octave .....tin ..	4 feet.	28—Cymbel. III ranks, tin	$1\frac{1}{3}$ foot.
22—Gemshorn....tin ..	4 feet.	29—Vox Humana..$\frac{3}{4}$ tin	8 feet tone.
23—Quinte.....tin ..	$2\frac{2}{3}$ feet.		

Third Manual, 10 Stops.

30—Principal . English tin	8 feet.	35—Quinte.....	$2\frac{2}{3}$ feet.
31—Fugara .. pine and maple-wood.....	8 feet.	36—Super octave.....	2 feet.
32—Gedact..oak-wood..	8 feet tone.	37—Mixtur.....IV ranks.	
33—Octave.....	4 feet.	38—Sesquialtera..II ranks.	
34—Rohrflöte . . metal ..	4 feet tone.	39—Schalomo..tin.....	8 feet tone.

Fourth Manual, 7 Stops.

40—Prestant....tin....	8 feet.	44—Super octave ..tin ..	2 feet.
41—Flüt douce..wood...	8 feet.	45—Cornet . II ranks . tin	$1\frac{1}{3}$ foot.
42—Octave ....tin....	4 feet.	46 { Oboe im descant. wood / Fagotto im Bass . wood }	8 feet.
43—Flüt traversiere . wood	4 feet.		

Pedal, 16 Stops.

47—Untersaz..wood....	32 feet tone.	55—Super octave..tin..	4 feet.
48—Principal. English tin	16 feet.	56—Nachthorn....tin..	2 feet.
49—Violon.....	16 feet.	57—Mixtur. V ranks. tin	2⅔ feet.
50—Quintatön.....	16 feet tone.	58—Rauschquinte. II ranks. tin.	
51—Subbass.....	16 feet.	59—Contraposaune. wood.	32 feet.
52—Octave..wood & metal	8 feet.	60—Posaune.....wood.	16 feet.
53—Violoncello.....	8 feet.	61—Trompete....¾ tin.	8 feet.
54—Quinte.....metal.	5⅓ feet.	62—Clarino.....¾ tin.	4 feet.

Accessory Stops, &c.

1, 2, 3, 4—Couplers for all 4 Manuals.	6 to 12—Seven Wind-trunk Valves.
5—Coupler, Great to Pedal.	13—Tremulant.

58. Naumberg.

The Organ in the Church of St. Wenzel, in Naumberg, contains 52 Sounding Stops, 3 Manuals, and a Pedal of 12 Stops; 3000 Pipes, and 7 large pairs of Bellows. The oldest parts of the instrument date as far back as 1613, to which additions were made in 1734 (by Hildebrand, of Leipzig), in 1787, and in 1810. The present contents of the Organ are as follow:

Great, 15 Stops.

1—Principal.....	16 feet.	9—Quinte.....	3 feet.
2—Quintatön.....	16 feet tone.	10—Octave.....	2 feet.
3—Octave.....	8 feet.	11—Weitpfeife.....	2 feet.
4—Spitzflöte.....	8 feet.	12—Mixtur....V ranks.	
5—Gedact.....	8 feet tone.	13—Cornett....V ranks.	
6—Prestant.....	4 feet.	14—Bombard.....	16 feet.
7—Spitzflöte.....	4 feet.	15—Trompete.....	8 feet.
8—Gedact.....	4 feet tone.		

Echo, 14 Stops.

16—Bourdon.....	16 feet tone.	23—Gemshorn.....	4 feet.
17—Principal.....	8 feet.	24—Gedact.....	4 feet tone.
18—Principal undamar..	8 feet.	25—Quinte.....	3 feet.
19—Hellflöte.....	8 feet.	26—Octave.....	2 feet.
20—Flauto traverso....	8 feet.	27—Waldflöte.....	2 feet.
21—Clav. Æoline.....	8 feet.	28—Sifflöte.....	1 foot.
22—Prestant.....	4 feet.	29—Mixtur..V ranks.	

Choir, 11 Stops.

30—Tibia major.....	16 feet tone.	36—Quintaton.....	8 feet tone.
31—Principal.....	8 feet.	37—Prestant.....	4 feet.
32—Gemshorn.....	8 feet.	38—Rohrflöte.....	4 feet tone.
33—Viola di Gamba.....	8 feet.	39—Octave.....	2 feet.
34—Fugara.....	8 feet.	40—Mixtur..V ranks....	3 feet.
35—Rohrflöte.....	8 feet tone.		

Pedal, 12 Stops.

41—Principal.....	16 feet.	47—Octave.....	4 feet.
42—Violon.....	16 feet.	48—Octave.....	2 feet.
43—Subbass.....	16 feet tone.	49—Mixtur...V ranks....	3⅕ feet.
43—Octavbass.....	8 feet.	50—Posaune.....	32 feet.
45—Violon.....	8 feet.	51—Posaune.....	16 feet.
46—Quinte.....	6 feet.	52—Trompete.....	8 feet.

59. Trebniz.

The Organ in the Catholic Church at Trebniz has 33 Sounding Stops, which are distributed as follows:

Great, 13 Stops.

1—Bourdon, wood.....	16 feet tone.
2—Principal .. Eng. tin, in front	8 feet.
3—Salicet..$\frac{7}{8}$ tin to tenor F, wood bass	8 feet.
4—Gemshorn . metal, except the bottom octave, which is of wood	8 feet.
5—Quintaton . half tin..	8 feet tone.
6—Rohrflöte . metal, except the 8 feet octave, which is of wood ..	8 feet.
7—Gemshornquinte . metal	$5\frac{1}{3}$ feet.
8—Octave .. Eng. tin, in front..... ..	4 feet.
9—Doppelrohrflöte . maple-wood	4 feet.
10—Quinte..metal	$2\frac{2}{3}$ feet.
11—Super octave..metal.	2 feet.
12—Mixtur .V ranks.	
13—Trompete..$\frac{7}{8}$ tin ...	8 feet.

Choir, 9 Stops.

14—Principal..Eng. tin .	8 feet.
15—Salicet .. $\frac{7}{8}$ tin, the lowest octave of wood	8 feet.
16—Portunalflöte..wood .	8 feet.
17—Flaut major ..wood .	8 feet tone.
18—Salicet..tin	4 feet.
19—Portunal.....	4 feet.
20—Gemshornquint..half tin.....	3 feet.
21—Super octave..metal .	2 feet.
22—Cymbel..III ranks.	

Pedal, 11 Stops.

23—Principal.. .wood..	16 feet.
24—Gamba.....wood..	16 feet.
25—Salicet . ....wood..	16 feet.
26—Subbass ....wood..	16 feet tone.
27—Quintenbass . wood..	$10\frac{2}{3}$ feet.
28—Octavenbass . wood..	8 feet.
29—Salicet .....wood..	8 feet.
30—Doppelflaut..wood..	8 feet tone.
31—Super octave . wood..	4 feet.
32—Posaune ....wood..	16 feet.
33—Trompete ...$\frac{7}{8}$ tin..	8 feet.

Accessory Stops, &c.

1—Coupler, Choir to Great.	3, 4—Two Wind-trunk Valves.
2—Coupler, Great to Pedal.	Four Bellows, 9 feet by $4\frac{1}{2}$.

Compass.

Manuals, CC to f^3 in alt.	Pedal, CCC to tenor d.

60. Salzwedel.

The Organ in the Church of St. Catharine, in the new town of Salzwedel, has 42 Sounding Stops, and was built by Friedrick Turley, of Treuenbritzen, in 1838.

Great, 15 Stops.

1—Principal..in front..	16 feet.
2—Octave	8 feet.
3—Spitzflöte	8 feet.
4—Gedact.....	8 feet tone.
5—Quinte.....	$5\frac{1}{3}$ feet.
6—Super octave.....	4 feet.
7—Rohrflöte.....	4 feet tone.
8—Leiblichgedact.....	4 feet tone.
9—Quinte.....	$2\frac{2}{3}$ feet.
10—Super octave.....	2 feet.
11—Cornett...IV ranks,	6, 4, $3\frac{1}{5}$ and 2 feet.
12—Scharf....IV ranks,	2, $1\frac{3}{5}$, $1\frac{1}{3}$, and 1 foot.
13—Cymbel..III ranks,	1, $\frac{1}{2}$, and $\frac{1}{4}$ foot.
14—Trompete	16 feet.
15—Trompete.....	8 feet.

Choir, 13 Stops.

16—Bourdon.....	16 feet tone.	23—Gemshorn.....	4 feet.
17—Principal..in front..	8 feet.	24—Nassat.....	3 feet.
18—Viola di Gamba	8 feet.	25—Super octave.....	2 feet.
19—Salicional	8 feet.	26—Mixtur..IV ranks,	2, 1⅓, 1, and ½ foot.
20—Quintatön	8 feet tone.	27—Æoline.....	16 feet.
21—Lieblichgedact.....	8 feet tone.	28—Hautbois..to c^1....	8 feet.
22—Octave.....	4 feet.		

Pedal, 14 Stops.

29—Principal..in front..	16 feet.	36—Nasat.....	6 feet.
30—Violon	16 feet.	37—Super octave.....	4 feet.
31—Subbass	16 feet tone.	38—Compensation Mixtur, V ranks.	
32—Gross-Nassat.....	12 feet.	39—Posaune.....	16 feet.
33—Octave	8 feet.	40—Dulcian	16 feet.
34—Gedact	8 feet tone.	41—Trompete	8 feet.
35—Tertia.....	6⅖ feet.	42—Clarion.....	4 feet.

Accessory Stops, &c.

1—Coupler, Choir to Great.	3, 4, 5—Three Wind-trunk Valves.
2—Tremulant.	Six Bellows.

61. Weissenfels.

The Organ in the Lock Church at Weissenfels was built by Schulze. It has 19 Stops, 2 Manuals, and Pedal. The following is a list of its contents:

Great, 10 Stops.

1—Bourdon.....	16 feet tone.	6—Octave.....	4 feet.
2—Principal	8 feet.	7—Quinta.....	2⅔ feet.
3—Viola di Gamba....	8 feet.	8—Octave.....	2 feet.
4—Hohlflöte	8 feet.	9—Mixtur..V ranks..	2 feet.
5—Gedact.....	8 feet tone.	10—Scharf...III ranks..	2 feet.

Choir, 5 Stops.

11—Lieblich Gedact....	16 feet tone.	14—Lieblich Gedact	8 feet tone.
12—Salcional.....	8 feet.	15—Principal.....	4 feet.
13—Flauto traverso	8 feet.		

Pedal, 4 Stops.

16—Gedact	16 feet tone.	18—Gedact.....	8 feet tone.
17—Principal	8 feet.	19—Posaune.....	16 feet.

Accessory Stops.

1—Coupler, Choir to Great.	2—Coupler, Great to Pedal.

Compass.

Manuals, CC to f^3 in alt.	Pedal, CCC to tenor d.

62. Celle.

The Organ in the Ludwigs Church at Celle has 15 Stops, 2 Manuals, and Pedal. The following are the names of the Stops:

Great, 7 Stops.

1—Bourdon .. metal to middle c^1, the remaining 2 octaves of wood..... 16 feet tone.	3—Rohrflote . metal treble, wood bass ..... 8 feet tone.
2—Principal . 12 loth. tin, in front..... 8 feet.	4—Octave . 4 loth metal .. 4 feet.
	5—Gemshorn . 4 loth metal 4 feet.
	6—Octave . 4 loth metal.. 2 feet.
	7—Mixtur..III ranks.

Choir, 4 Stops.

8—Salcional ..... 8 feet.	10—Rohrflote . 4 loth. metal 4 feet tone.
9—Gedact . metal treble, wood bass ..... 8 feet tone.	11—Waldflote . 4 loth metal ..... 2 feet.

Pedal, 4 Stops.

12—Subbass..wood .... 16 feet tone.	14—Octave..4 loth. metal . 4 feet.
13—Principal. 12 loth.metal 8 feet.	15—Posaune..... 16 feet.

63. Verden.

The Organ in the pretty little Cathedral at Verden is a particularly fine Instrument, built by Schulze, containing 34 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Bourdon ..... 32 feet tone.	8—Octave ..... 4 feet.
2—Bourdon ..... 16 feet tone	9—Flote..... 4 feet.
3—Principal ..... 8 feet.	10—Hohlflote ..... 4 feet.
4—Gedact..... 8 feet tone.	11—Quint and Octave .. $2\frac{2}{3}$ & 2 feet.
5—Gamba..... 8 feet.	12—Mixtur ..V ranks.. 2 feet.
6—Hohlflote ..... 8 feet.	13—Cymbal, III ranks.. 2 feet.
7—Quint ..... $5\frac{1}{3}$ feet.	14—Cornett, III ranks.. 4 feet.

Choir, 11 Stops.

15—Leiblich Gedact.... 16 feet tone.	21—Geigen Principal. .. 4 feet.
16—Leiblich Gedact.. . 8 feet.	22—Flauto Traverso.... 4 feet.
17—Geigen Principal... 8 feet.	23—Quint and Octave... 2_2 & 2 feet.
18—Salicional..... 8 feet.	24—Scharf, III ranks.
19—Flauto Traverso.... 8 feet.	25—Æoline..... 8 feet.
20—Harmonica..... 8 feet.	

Pedal, 9 Stops.

26—Principal-bass..... 16 feet.	31—Gedact-bass..... 8 feet.
27—Sub-bass..... 16 feet.	32—Violoncello. ..... 8 feet.
28—Violon..... 16 feet.	33—Posaune ..... 32 feet.
29—Quinten-bass ..... $10\frac{2}{3}$ feet.	34—Posaune ..... 16 feet.
30—Octave-bass. ..... 8 feet.	

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to Tenor d, 27 notes.

64. Bremen.

The Organ in the Cathedral Church at Bremen was built by Schulze, and contains 59 Stops, 16 of which are devoted to the Pedal. It presents the peculiarities of having a Stop of 32-feet tone on the Choir as well as on the Great Manual, and of having a Great Stopped Quint of $21\frac{1}{3}$ feet tone on the Pedal. The following is the Specification of the above-named Instrument.

Great, 16 Stops.

1—Bourdon, to Tenor c key	32 feet tone.	9—Octave	4 feet.
2—Principal	16 feet.	10—Flote	4 feet.
3—Bourdun	16 feet tone.	11—Quint and Octave	$2\frac{2}{3}$ & 2 ft.
4—Principal	8 feet.	12—Mixture, V ranks	2 feet.
5—Gedact	8 feet tone.	13—Cymbel, III ranks	2 feet.
6—Gamba	8 feet.	14—Cornett, III ranks	4 feet.
7—Hohlflote	8 feet.	15—Trompet	16 feet.
8—Quint	$5\frac{1}{3}$ feet.	16—Trompet	8 feet.

Choir, 13 Stops.

17—Bourdon, to Tenor c key	32 feet tone.	24—Flote	4 feet.
18—Bourdon	16 feet tone.	25—Spitzflote	4 feet.
19—Salicional	8 feet.	26—Quint and Octave	$2\frac{2}{3}$ & 2 ft.
20—Gedact	8 feet tone.	27—Mixture, V ranks	2 feet.
21—Flote	8 feet.	28—Scharff, III ranks	2 feet.
22—Principal	8 feet.	29—Phizharmonica	8 feet.
23—Octave	4 feet.		

Swell, 14 Stops.

30—Leiblich Gedact	16 feet tone.	37—Geigen Principal	4 feet.
31—Geigen Principal	8 feet.	38—Flauto traverso	4 feet.
32—Harmonica	8 feet.	39—Zart-flote	4 feet.
33—Leiblich Gedact	8 feet tone.	40—Quint	$2\frac{2}{3}$ feet.
34—Terpodion	8 feet.	41—Octave	2 feet.
35—Gedact-flote	8 feet tone.	42—Mixture, III ranks	2 feet.
36—Flauto traverso	8 feet.	43—Æoline	8 feet.

Pedal, 16 Stops.

44—Principal-bass	32 feet.	52—Gedact-bass	8 feet tone.
45—Gross-Quinten-bass	$21\frac{1}{3}$ ft. tone.	53—Floten-bass	8 feet.
46—Principal-bass	16 feet.	54—Violoncello	8 feet.
47—Major-bass	16 feet.	55—Octave	4 feet.
48—Violon	16 feet.	56—Posaune	32 feet.
49—Sub-bass	16 feet tone.	57—Reim	16 feet.
50—Quinten-bass	$10\frac{2}{3}$ ft. tone.	58—Posaune	16 feet.
51—Octaven-bass	8 feet.	59—Trompet	8 feet.

65. Hamburg.

The ancient city of Hamburg was long celebrated for the number and excellence of its 32-feet Organs, two of which, however, perished in the great conflagration of 1842. Of the three which remain, that in the present Church of St. Michael is the best known, and is also the most modern one.

The Church and Organ of St. Michael's, Hamburg.

The old Church of St. Michael being struck by lightning and burnt down, the present edifice was commenced in 1750, from the designs of Mr. Ernst George Sonnin, and opened for service in 1762. The height of the church inside is 93 feet, its length 249 feet, and its breadth 178 feet. The Organ stands at the west end and contains the following stops:

Great Organ, 18 Stops.

1—Principal, tin..... 16 feet.
2—Quintadena, wood and metal..... 16 feet tone.
3—Octave, tin..... 8 feet.
4—Gedact, wood and metal..... 8 feet tone.
5—Gamba, tin..... 8 feet.
6—Gemshorn, metal.. 8 feet.
7—Quint, tin..... 5⅓ feet.
8—Octave, tin..... 4 feet.
9—Gemshorn, metal.. 4 feet.
10—Nasat, metal..... 2⅔ feet.
11—Octave, tin..... 2 feet.
12—Rauschpfeif, II ranks, tin..... 2⅔ feet.
13—Mixture VIII ranks, tin..... 2 feet.
14—Scharf, V ranks, tin. 1⅓ foot.
15—Cornet, V ranks, tin. 8 feet.
16—Trompete, tin.... 16 feet.
17—Trompete, tin.... 8 feet.
18—Oboe, from tenor f, tin..... 8 feet.

Choir Organ, 16 Stops.

19—Rohrflote, wood and metal..... 16 feet tone.
20—Principal, tin.... 8 feet.
21—Principal, to fiddle g. 8 feet.
22—Rohrflote, metal... 8 feet tone.
23—Flauto Traverso, wood 8 feet.
24—Klein Gedact, wood. 8 feet tone.
25—Octave, tin..... 4 feet.
26—Rohrflote, metal... 4 feet tone.
27—Nasat, tin..... 2⅔ feet.
28—Octave, tin..... 2 feet.
29—Flach-flote, metal.. 2 feet.
30—Quint, tin..... 1⅓ foot.
31—Rauschpfeif, II ranks. tin..... 2⅔ feet.
32—Cymbal, V ranks, tin.
33—Chalameau, tin.... 8 feet.
34—Trompete, tin.... 4 feet.

Upper-work and Swell on the same Manual, 20 Stops.

Upper-work.

35—Bourdon, wood and metal..... 16 feet tone.
36—Principal, tin.... 8 feet.
37—Quintadena, wood and metal..... 8 feet tone.
38—Spitzflote, metal.. 8 feet.
39—Under maris, to fiddle g..... 8 feet.
40—Octave, tin..... 4 feet.
41—Spitzflote, metal... 4 feet.
42—Quint, tin..... 2⅔ feet.
43—Octave, tin..... 2 feet.
44—Rauschpfeif, 2 ranks. tin..... 2⅔ feet.
45—Cymbal, V ranks, tin..... 1⅓ foot.
46—Echo cornet, to fiddle g, V ranks.. 8 feet.
47—Trompete..... 8 feet.
48—Vox humana, tin.. 8 feet.
49—Cremona to tenor f. 8 feet.
50—Glockenspiel to tenor f 8 feet.

Swell.

51—Octave..... 8 feet.
52—Octave..... 4 feet.
53—Cornet, V ranks in the treble, II in the bass
54—Trompete..... 8 feet.

Pedal, 16 Stops.

55—Principal, tin..... 32 feet.
56—Sub-bass, wood.... 32 feet tone.
57—Principal, tin..... 16 feet.
58—Sub-bass, open, wood 16 feet.
59—Sub-bass, stopped, wood..... 16 feet tone.
60—Violone, wood..... 16 feet.
61—Rohr-quint, metal.. 10⅔ feet tone.
62—Octave, tin..... 8 feet.
63—Gedact, tin..... 8 feet tone.
64—Octave, tin..... 4 feet.
65—Mixture, tin, X ranks.
66—Posaune, tin..... 32 feet.
67—Pasaune, tin..... 16 feet.
68—Fagotto..... 16 feet.
69—Trompete, tin.... 8 feet.
70—Clarino, tin..... 4 feet.

Accessory Stops.

1—Tremulant to great Manual.	4—Wind to Choir Organ.
2—Cymbalstar.	5—Wind to Upper-work.
3—Wind to Great Organ.	6—Wind to Pedal Organ.

The case presents a handsome front, sixty feet in height, and sixty feet in width. The thirty-two feet pipe stands in the centre by itself, in an immense pilaster, the remainder of the thirty-two feet stop in two great concave compartments, one on each side, and every pipe is supported below by a base, and finished off above with a Corinthian capital, gilded, the pipes themselves forming the shafts, being of their natural bright silvery colour.

The organ is finely laid out inside, in four stories, to each of which free access is obtained by wide staircases with hand-rails. Passage-boards occur in abundance; and any pipe in this immense instrument can be got at without disturbing a second one.

There are no "conveyanced off" pipes, except those which appear in the front of the case, the site of the organ being so favourable as to allow of the sound-boards being made of ample dimensions.

Those of the Great Organ are made "in halves," each half measuring from $8\frac{1}{2}$ to 9 feet in length, and the pipes of every stop stand in a single row, even to the 16-feet double trumpet.

The C C C C pipe in the middle of the front is made of pure tin, is 35 feet 6 inches in length, weighs upwards of 960 pounds, is 20 inches in diameter, and the body was cast in one sheet.

The diameter of the 32-feet Posaune is 16 inches at the bell, and of the 16-feet Posaune, 10 inches. A light sieve of metal wire, with wide meshes, placed over the bell of each of the large reed-pipes, keeps out the birds—a most necessary and excellent precaution. The tops of a great portion of the large metal pipes also have an addition that is by no means common. This consists of a sliding cylinder, introduced to aid the process of tuning, which is drawn up or pressed down according as the pitch of the pipe may require flattening or sharpening. The top of the pipe is further covered with leather outside, to prevent the cylinder slipping. None of the pipes are pressed out of shape, none present bent or ragged tops, as is too frequently the case in English Organs, but all preserve their symmetry of outline.

Silberman, the celebrated organ builder, of Dresden, was invited to construct the new St. Michael's Organ, which invitation he accepted; but, dying shortly afterwards, the execution of the work was entrusted to his principal workman, Hildebrand. This was about the year 1768. T. Mattheson, the celebrated composer and theorist, left, by will, £4000 towards paying for this Organ; which sum, however, did not nearly equal the amount expended in its fabrication.

66. Hamburg.

It is not known by whom the fine-toned Organ in St. Catharine's Church at Hamburg was built; but it is said to be about 400 years old. It contains 54 Sounding Stops, distributed among 4 Manuals and Pedal; and, like the preceding, has a 32-feet front of Tin.

Great, 11 Stops.

1—Principal	16 feet.	7—Rauschpfeife, II rks.	$2\frac{2}{3}$ and 2 feet.
2—Quintadena	16 feet tone.	8—Octave	2 feet.
3—Octave	8 feet.	9—Mixtur, X ranks.	
4—Spitzflote	8 feet.	10—Trompete	16 feet.
5—Gamba	8 feet.	11—Trompete	8 feet.
6—Octave	4 feet.		

Choir, 13 Stops.

12—Bourdon, 3 top octaves only	16 feet tone.	18—Nasat	$2\frac{2}{3}$ feet.
13—Principal, 2 Pipes to each key in the treble	8 feet.	19—Sesquialtera, II ranks.	
14—Gedact	8 feet tone.	20—Sifflote	1 foot.
15—Quintadena	8 feet.	21—Scharf, VIII ranks.	
16—Octave	4 feet.	22—Dulcian	16 feet.
17—Klein-hohlflote	4 feet.	23—Trompete, to tenor c	8 feet.
		24—Hautbois d'amour	8 feet.

Echo, 10 Stops.

25—Principal	8 feet.	30—Wald-flote	2 feet.
26—Rohr-flote	8 feet tone.	31—Scharf, III to V ranks.	
27—Gedact	8 feet tone.	32—Trompete	8 feet.
28—Octave	4 feet.	33—Trompete	4 feet.
29—Flote	4 feet.	34—Vox humana	8 feet tone.

Swell, 7 Stops.

35—Principal	8 feet.	39—Scharf, VII ranks.	
36—Octave	4 feet.	40—Trompete	8 feet.
37—Quintadena	4 feet tone.	41—Oboe	8 feet.
38—Quinte	$2\frac{2}{3}$ feet.		

Pedal, 13 Stops.

42—Principal, in front	32 feet.	49—Mixtur III ranks.	
43—Principal	16 feet.	50—Posaune	32 feet.
44—Subbass	16 feet tone.	51—Posaune	16 feet.
45—Quinte	$10\frac{2}{3}$ feet.	52—Dulcian	16 feet.
46—Octave	8 feet.	53—Trompete	8 feet.
47—Octave	4 feet.	54—Trompete	4 feet.
48—Octave	2 feet.		

Accessory Stops.

1—Cymbelstern.	4—Calcant-glock.
2—Tremulant.	5 to 10—Six Wind-trunk Valves.
3—Glockenspiel.	

67. Hamburg.

The fine Organ in the Church of St. Jacobi, at Hamburgh, was built by the Abbe Schnittker, and was completed towards the close of the seventeenth century. It has 60 Sounding Stops, 4 Manuals, and Pedal of 14 Stops. The following is the disposition:

Great, 12 Stops.

1—Principal	16 feet.	8—Quinte	$2\frac{2}{3}$ feet.
2—Quintadena	16 feet tone.	9—Superoctave	2 feet.
3—Octave	8 feet.	10—Mixtur, VI and VIII ranks.	
4—Viola di Gamba	8 feet.	11—Rauschpfeife.	
5—Spitzflote	8 feet.	12—Trompete	16 feet.
6—Octave	4 feet.		
7—Rohrflote	4 feet tone.		

Choir, 13 Stops.

13—Principal	8 feet.	20—Octave	2 feet.
14—Bauerpfeife	8 feet.	21—Sifflote	1 foot.
15—Quintadena	8 feet tone.	22—Sesquialtera, II ranks	$2\frac{2}{3}$ feet.
16—Gedact	8 feet tone.	23—Scharf, VI and VIII ranks.	
17—Octave	4 feet.	24—Dulcian	8 feet.
18—Blockflote	4 feet.	25—Trompete	8 feet.
19—Nasat	$2\frac{2}{3}$ feet.		

Echo, 13 Stops.

26—Principal	8 feet.	33—Gemshorn	2 feet.
27—Holzflote	8 feet.	34—Cymbel, III ranks.	
28—Rohrflote	8 feet tone.	35—Scharf, VI ranks.	
29—Octave	4 feet.	36—Trompet	8 feet.
30—Spitzflote	4 feet.	37—Oboe, to middle c^1	8 feet.
31—Nasat	$2\frac{2}{3}$ feet.	38—Vox humana	8 feet tone.
32—Octave	2 feet.		

Swell, 8 Stops.

39—Principal	8 feet.	44—Scharf, VI and VIII ranks.	
40—Octave	4 feet.	45—Dulcian	8 feet.
41—Hohlflote	4 feet.	46—Trichter-regal	8 feet.
42—Waldflote	2 feet.		
43—Sesquialtera, 2 ranks	$2\frac{2}{3}$ feet.		

Pedal 14 Stops.

47—Principal, in front	32 feet.	54—Rauschpfeife, II rks.	
48—Octave	16 feet.	55—Posaune	32 feet.
49—Subbass	16 feet tone.	56—Posaune	16 feet.
50—Octave	8 feet.	57—Dulcian	16 feet.
51—Octave	4 feet.	58—Trompete	8 feet.
52—Nachthorn	2 feet.	59—Trompete	4 feet.
53—Mixtur, VI and VIII ranks.		60—Cornet	2 feet.

The 4 Manuals can be coupled together.

Accessory Stops.

1 to 5—Five Wind-trunk Valves.	7—Glockenspiel.
6—Cymbelstar.	8—Trommel.

The name of the builder of the above excellent Organ is held in great veneration in Germany; where his Instruments are as highly prized for their stability, as they are justly celebrated for their dignified and impressive tone. The Abbe Schnittker

resided at a place about 36 English miles from Hamburg, in the Hanoverian territories, in a house that has gone by the name of "the Organ-builder's box" or Villa ever since.

The three fine Instruments just noticed form most interesting objects for examination to an English admirer of the Organ; not simply on account of the very distinct character in the tone of each, but because they so closely resemble in quality the Organs of three of the most celebrated builders of this country of past times; and they therefore picture to the hearer what the Instruments of those builders would have been, had the Art in England been in a more advanced state in their day.

The Organ in the Church of St. Catherine, which is the oldest of the three, is strikingly like Harris's in tone; clear, ringing, and dashing in the Mixtures. That in the Church of St. Jacobi calls to mind the Instruments of Father Smith; resonant, solemn, and dignified; with somewhat less fire than that at St. Catherine's, but rather more fulness. The Organ at St. Michael's, the most recently constructed one of the three, is also the largest in scale; is less powerful than the others, but very musical and pleasing; and, in all these respects, forcibly calls to mind the excellent Instruments of Green.

68. Hamburg.

The Organ that lately stood in the Church of St. Nicholas, at Hamburg, had 67 Sounding Stops, and, like the last, was built by Schnittker, who completed it in the year 1686. The following is a list of the Stops that were contained in this Instrument.

Great, 14 Stops.

1—Principal	16 feet.	8—Spitzflote	4 feet.
2—Quintadena	16 feet tone.	9—Rauschpfeife, III rks.	2⅔ feet.
3—Octave	8 feet.	10—Superoctave	2 feet.
4—Spitzflote	8 feet.	11—Mixtur, VI to IX rks.	
5—Salcional, wood	8 feet.	12—Scharf, III ranks.	
6—Viola di Gamba	8 feet.	13—Trompete	16 feet.
7—Octave	4 feet.	14—Trompete	8 feet.

Echo, 14 Stops.

15—Quintadena	16 feet tone.	22—Flachflote	2 feet.
16—Octave	8 feet.	23—Scharf, IV to VI rks.	
17—Quintadena	8 feet tone.	24—Cymbel, III ranks.	
18—Rohrflote	8 feet tone.	25—Trompete	8 feet.
19—Octave	4 feet.	26—Trompete	4 feet.
20—Rohrflote	4 feet tone.	27—Krumhorn	8 feet tone.
21—Nasat	2⅔ feet.	28—Vox humana	8 feet tone.

Choir, in front, 13 Stops.

29—Bourdon	16 feet tone.	36—Sifflote	2 feet.
30—Principal	8 feet.	37—Querflote	2 feet.
31—Quintadena	8 feet tone.	38—Scharf, VI to IX rks.	
32—Gedact	8 feet tone.	39—Dulcian	16 feet.
33—Octave	4 feet.	40—Trompete	8 feet.
34—Rohrflote	4 feet tone.	41—Trompete to middle c¹	8 feet.
35—Sesquialtera, II rks.	2⅔ feet.		

Brustwerk, 16 Stops.

42—Principal	8 feet.	47—Rauschpfeif, II rks.	$2\frac{2}{3}$ feet.
43—Barpfeife	8 feet.	48—Waldflote	2 feet.
44—Blockflote, wood	8 feet.	49—Nasat	$1\frac{1}{3}$ feet.
45—Principal	4 feet.	50—Scharf, III to VI rks.	
46—Blockflote, wood	4 feet.	51—Dulcian	8 feet.

Pedal, 16 Stops.

52—Principal	32 feet.	60—Nacht-horn	2 feet.
53—Octave	16 feet.	61—Mixtur, VI to X rks.	
54—Quint	$10\frac{2}{3}$ feet.	62—Posaune	32 feet.
55—Octave	8 feet.	63—Posaune	16 feet.
56—Violoncello	8 feet.	64—Dulcian	16 feet.
57—Rauschpfeife, III rks	$5\frac{1}{3}$ feet.	65—Trompete	8 feet.
58—Octave	4 feet.	66—Krumhorn	8 feet tone.
59—Gedact	4 feet tone.	67—Trompete	4 feet.

Accessory Stops.

1—Cymbelstar.	4—Riegal.
2—Glockenspiel.	5 to 10—Six Wind-trunk Valves.
3—Tremulant.	11—Coupler, Choir to Pedal.

69. Hamburg.

The Organ that stood in St. Peter's Church previous to the fire was the most ancient one in the City. It is not known when or by whom it was originally built; but the last two Manuals, which were subsequent additions, were made upwards of 300 years ago, i. e. in 1548, at Hartzogenbuch, in Brabant, and sent thither by sea. The Stops in the above Organ were as follow:

Great, 11 Stops.

1—Principal	16 feet.	7—Octave	4 feet.
2—Gedact	16 feet tone.	8—Rauschpfeife, II rks.	$2\frac{2}{3}$ feet.
3—Octave	8 feet.	9—Mixtur, IV ranks.	
4—Rohrflote	8 feet tone.	10—Scharf, III ranks.	
5—Viola di Gamba	8 feet.	11—Trompete	16 feet.
6—Quint	$5\frac{1}{3}$ feet.		

Echo, 14 Stops.

12—Quintadena	16 feet tone.	19—Sesquialtera, II rks.	$2\frac{2}{3}$ feet.
13—Principal	8 feet.	20—Mixtur, IV ranks.	
14—Principal	8 feet.	21—Cornet, V ranks.	
15—Gedact	8 feet tone.	22—Trompete	8 feet.
16—Octave	4 feet.	23—Trompete	8 feet.
17—Spitzflote	4 feet.	24—Oboe discant	8 feet.
18—Nasat	$2\frac{2}{3}$ feet.	25—Vox humana	8 feet tone.

Choir, in front, 12 Stops.

26—Principal	8 feet.	32—Flote	2 feet.
27—Quintadena	8 feet tone.	33—Sifflote	1 foot.
28—Gedact	8 feet tone.	34—Scharfe, IV ranks.	
29—Octave	4 feet.	35—Dulcian	16 feet.
30—Blockflote	4 feet.	36—Trompete	8 feet.
31—Sesquialtera, II rks.	$2\frac{2}{3}$ feet.	37—Trompete, tenor c	8 feet.

Pedal, 13 Stops.

38—Principal..... 32 feet.
39—Untersatz..... 16 feet.
40—Octave..... 8 feet.
41—Rohr-quint..... 5⅓ feet tone.
42—Octave..... 4 feet.
43—Mixtur, VI ranks.
44—Rauschpfeife, II ranks.
45—Posaune..... 32 feet.
46—Posaune..... 16 feet.
47—Dulcian..... 16 feet.
48—Trompete..... 8 feet.
49—Trompete..... 4 feet.
50—Cornet..... 2 feet.

70. Lubeck.

The Marien Kirche, in the ancient Town of Lübeck, contains two Organs; the largest of which stands at the west end of the Church, a stately Gothic edifice, measuring upwards of 120 English feet in height inside, and about 300 feet in length. At what period the west-end organ was first erected is not known; but the Choir Organ in front, a subsequent addition, was made as far back as the year 1561, which date is ingeniously recorded among the ornamental carving on the top. The case presents a most noble and magnificent, though not elaborate, facade; and is from 70 to 80 feet in height, 40 in width, and 7 feet in depth. It has the 32-feet metal Pipes in front, the largest of which is 19 inches in diameter. All the front Pipes are of pure Tin, burnished; and are slightly but exquisitely diapered about the mouth. The case is made of a handsome dark wood, probably walnut, and has a great quantity of carved and gilt work about it, which gives a gorgeous effect to the whole.

This Instrument has just had a new inside put to it, by J. F. Schulze, of Paulinzelle, from a Specification drawn up by H. Jimmerthal, the organist to the Church. It is laid out in four stories, the Swell occupying the upper one. The frame-work and Sound-boards are almost entirely of oak; the Front-boards of the latter being of polished mahogany, handsomely inlaid with ebony. The Front-boards are fastened on with *wooden* screws having large six-sided heads, which present the great advantage of being capable of being turned by the fingers unaided. The beams that support the Organ are built into the wall behind; and the Organ hangs, pendant fashion, therefrom, with most elegant effect.

The Organ contains 82 Sounding-stops, distributed among 4 Manuals and 2 Pedals; and includes 3 Stops of 32 feet; 17 of 16 feet; and 30 of 8 feet.

The following is a detailed account of its contents:

Great, 21 Stops.

1—Bordun, to tenor c .. 32 feet tone.
2—Principal..... 16 feet.
3—Viola Major..... 16 feet.
4—Bordun..... 16 feet tone.
5—Principal..... 8 feet.
6—Gemshorn..... 8 feet.
7—Hohlflote..... 8 feet.
8—Viola di Gamba.... 8 feet.
9—Gedackt..... 8 feet tone.
10—Quinte..... 5⅓ feet.
11—Octave..... 4 feet.
12—Spitzflote..... 4 feet.
13—Gambette..... 4 feet.
14—Nassat..... 2⅔ feet.
15—Rausch-quinte, II fach..... 2⅔—2 feet.
16—Mixtur, V fach.... 2 feet.
17—Cymbel, III fach .. 2 feet.
18—Cornett, IV fach.
19—Trompete..... 16 feet.
20—Trompete..... 8 feet.
21—Trompete..... 4 feet.

Choir, 16 Stops.

22—Principal	16 feet.	30—Gemshorn	4 feet.
23—Bordun	16 feet tone.	31—Rohrflote	4 feet tone.
24—Principal	8 feet.	32—Quinte	$2\frac{2}{3}$ feet.
25—Salicional	8 feet.	33—Octave	2 feet.
26—Spitzflote	8 feet.	34—Mixtur, V fach	2 feet.
27—Czakan Flote	8 feet.	35—Scharf, III fach.	2 feet.
28—Gedackt	8 feet tone.	36—Physharmonika	16 feet.
29—Octave	4 feet.	37—Trompete	8 feet.

Echo, 14 Stops.

38—Leiblich Gedackt	16 feet tone.	45—Zart-flöte	4 feet.
39—Geigen Principal.	8 feet.	46—Flauto Traverso	4 feet.
40—Terpodion	8 feet.	47—Quinte	$2\frac{2}{3}$ feet.
41—Leiblich Gedackt	8 feet tone.	48—Wald-flöte	2 feet.
42—Flauto Traverso	8 feet.	49—Mixtur, V fach	2 feet.
43—Doppel-flöte	8 feet tone.	50—Aeoline	8 feet.
44—Geigen Principal	4 feet.	51—Oboe	8 feet.

Swell, 10 Stops.

52—Quintaton	16 feet tone.	57—Principal	4 feet.
53—Principal	8 feet.	58—Viola d'amore	4 feet.
54—Fugara	8 feet.	59—Mixtur, III fach	2 feet.
55—Gedackt	8 feet tone.	60—Aeoline	16 feet.
56—Harmonika	8 feet.	61—Clarinetto	8 feet tone.

Great Pedal, 16 Stops.

62—Gross Principal	32 feet.	70—Terz	$6\frac{2}{5}$ feet.
63—Principal Bass	16 feet.	71—Quinte	$5\frac{1}{3}$ feet.
64—Basso Magiore	16 feet.	72—Octave	4 feet.
65—Violon	16 feet.	73—Cornett, V fach.	
66—Quinte	$10\frac{2}{3}$ feet.	74—Contra Posaune	32 feet.
67—Principal Bass	8 feet.	75—Posaune	16 feet.
68—Basso Minore	8 feet.	76—Trompete	8 feet.
69—Violoncello	8 feet.	77—Clarine	4 feet.

Choir Pedal, 5 Stops.

78—Subbass	16 feet tone.	81—Gedackt	8 feet tone.
79—Doppelflotenbass	16 feet tone.	82—Fagotto	16 feet.
80—Violoncello	8 feet.		

Accessory Stops, &c.

1—Wind to Great.	6—Wind to Pedal Reed-work.
2—Wind to Choir.	7—Wind to Choir Pedal.
3—Wind to Echo.	8—Coupler, Choir to Great.
4—Wind to Swell.	9—Coupler, Echo to Great.
5—Wind to great Pedal Basses.	10—Coupler, Great to Pedal.

71. Lubeck.

The second Organ in this Church—the "little Organ," as it is called—contains 33 Stops; 3 Manuals and Pedal; has a 16-feet speaking front, and has the Choir Organ in front. The Specification is as follows:

Great, 8 Stops.

1—Quintaton.....	16 feet tone.	5—Flote.....	4 feet.
2—Principal.....	8 feet.	6—Rausch-quint, II rks.	$2\frac{2}{3}$ & 2 feet.
3—Spitzflote.....	8 feet.	7—Mixtur, IV and V ranks.	
4—Octave.....	4 feet.	8—Trompete.....	8 feet.

Choir, 11 Stops.

9—Principal.....	8 feet.	15—Sesquialtera, II ranks,	$2\frac{2}{3}$ and $1\frac{3}{5}$ feet.
10—Quintadena.....	8 feet tone.		
11—Rohrflote.....	8 feet tone.	16—Mixture, IV ranks.	
12—Octave.....	4 feet.	17—Scharf, V ranks.	
13—Rohrflote.....	4 feet tone.	18—Fagotto.....	16 feet tone.
14—Flote.....	2 feet.	19—Regal.....	8 feet.

Swell, 4 Stops.

20—Gedact.....	8 feet tone.	22—Cornet, III ranks.	
21—Gedact.....	4 feet tone.	23—Trompete.....	8 feet.

Pedal, 10 Stops.

24—Principal, in front..	16 feet.	29—Octave.....	2 feet.
25—Gross Quint, Stopped.	$10\frac{2}{3}$ feet tone.	30—Mixture, III ranks.	$2\frac{2}{3}$ feet.
26—Octave.....	8 feet.	31—Posaune.....	16 feet.
27—Gedact.....	8 feet tone.	32—Trompete.....	8 feet.
28—Octave.....	4 feet.	33—Schalmay.....	4 feet tone.

72. Lubeck.

The Organ in the second Church, not the Cathedral, has 4 Manuals and Pedal, and 45 Stops, of which the following is a list:

Great, 9 Stops.

1—Principal.....	16 feet.	6—Flote.....	4 feet.
2—Quintaton.....	16 feet tone.	7—Rauschpfeife, II rks.	$2\frac{2}{3}$ feet.
3—Octave.....	8 feet.	8—Mixtur, VIII ranks.	
4—Viola di Gamba....	8 feet.	9—Scharf, VI ranks.	
5—Octave.....	4 feet.		

Choir, 10 Stops.

10—Principal.....	8 feet.	15—Flote.....	4 feet.
11—Gedact.....	8 feet tone.	16—Sifflote.....	2 feet.
12—Quintaton.....	8 feet tone.	17—Mixtur, IV ranks.	
13—Barpfeife.....	8 feet.	18—Schalmey.....	8 feet tone.
14—Octave.....	4 feet.	19—Regal.....	8 feet.

Echo, 10 Stops.

20—Principal.....	8 feet.	25—Nassat.....	$2\frac{2}{5}$ feet.
21—Hohlflote.....	8 feet.	26—Waldflote.....	2 feet.
22—Zink.....	8 feet.	27—Cymbel, III ranks.	
23—Principal.....	4 feet.	28—Trompet.....	8 feet.
24—Flote.....	4 feet.	29—Vox Humana.....	8 feet tone.

Swell, 7 Stops.

30—Gedact.....	8 feet tone.	34—Scharf, IV ranks.	
31—Octave.....	4 feet.	35—Dulcian.....	16 feet.
32—Quintaton.....	4 feet tone.	36—Regal.....	8 feet.
33—Waldflote.....	2 feet.		

Pedal, 9 Stops.

37—Principal..... 16 feet.
38—Subbass..... 16 feet tone.
39—Octave..... 8 feet.
40—Violoncello ..... 8 feet.
41—Gedact..... 8 feet tone.
42—Octave..... 4 feet.
43—Mixtur, IV ranks.
44—Posaune..... 16 feet.
45—Trompet..... 8 feet.

73. Wismar.

The Organ in St. Mary's Church, at Wismar, was built by J. F. Schulze, and finished in 1840. It has 56 Sounding Stops, 8 Bellows, and 3 Manuals and Pedal. The following is a list of the Stops:

Great, 15 Stops.

1—Bourdon to g ..... 32 feet tone.
2—Principal ..... 16 feet.
3—Quintaton ..... 16 feet tone.
4—Octave ..... 8 feet.
5—Hohlflote ..... 8 feet.
6—Terpodion ..... 8 feet.
7—Gedact ..... 8 feet tone.
8—Quinte ..... $5\frac{1}{3}$ feet.
9—Octave ..... 4 feet.
10—Gemshorn ..... 4 feet.
11—Scharf, V ranks.
12—Cymbel, III ranks.
13—Cornet, III ranks.
14—Trompete ..... 16 feet.
15—Trompete ..... 8 feet.

Choir, 13 Stops.

16—Bourdon..... 16 feet tone.
17—Principal ..... 8 feet.
18—Gemshorn ..... 8 feet.
19—Gamba ..... 8 feet.
20—Flauto Traverso .... 8 feet.
21—Gedact ..... 8 feet tone.
22—Octave ..... 4 feet.
23—Spitzflote ..... 4 feet.
24—Flote ..... 4 feet.
25—Quinte & Octave, II ranks, $2\frac{2}{3}$ & 2 ft.
26—Mixtur, IV ranks... $1\frac{1}{3}$ foot.
27—Physarmonica..... 16 feet.
28—Trompete ..... 8 feet.

Swell, 11 Stops.

29—Leiblich Gedact .... 16 feet tone.
30—Geigen Principal.... 8 feet.
31—Salicional ..... 8 feet.
32—Zartflote..... 8 feet.
33—Flauto Traverso .... 8 feet.
34—Leiblich Gedact .... 8 feet tone.
35—Octave ..... 4 feet.
36—Fugara ..... 4 feet.
37—Waldflote ..... 2 feet.
38—Mixtur, III ranks.
39—Æoline ..... 8 feet.

Pedal, 17 Stops.

40—Principal-bass .... 32 feet.
41—Principal ..... 16 feet.
42—Quintaton ..... 16 feet tone.
43—Major-bass..... 16 feet.
44—Sub-bass ..... 16 feet tone.
45—Quinte..... $10\frac{2}{3}$ feet tone.
46—Octaven-bass..... 8 feet.
47—Violone ..... 8 feet.
48—Minor-bass..... 8 feet.
49—Gedact-bass ..... 8 feet tone.
50—Octave ..... 4 feet.
51—Mixtur, V ranks.
52—Posaune..... 32 feet.
53—Posaune..... 16 feet.
54—Bombarde ..... 16 feet.
55—Trompete ..... 8 feet.
56—Clarino ..... 4 feet.

74. Perleberg.

The Organ in the Church at Perleberg was built by Tobias Turley and his son John F. Turley, in 1831, and has 36 Sounding Stops:

Great, 14 Stops.

1—Bourdon	16 feet tone.	8—Lieblich gedact. metal	4 feet tone.
2—Principal .. Eng. tin, in front	8 feet.	9—Quinte . Prussian tin .	3 feet.
3—Spitzflote .. metal to tenor C, lowest octave wood	8 feet.	10—Super octave .. Prussian tin	2 feet.
4—Hohlflöte .. metal to tenor C, lowest octave wood	8 feet.	11—Scharf . V ranks, Prussian tin .. 2, $1\frac{3}{5}$, $1\frac{2}{3}$, 1, and $\frac{2}{3}$ feet.	
5—Rohrflote .. metal ..	8 feet tone.	12—Cymbel .. III ranks, Prussian tin .... 1, $\frac{1}{2}$, and $\frac{1}{4}$ foot.	
6—Octave . Prussian tin .	4 feet.	13—Cornett .. III ranks, Eng. tin .... $2\frac{2}{3}$, 2, and $1\frac{3}{5}$ foot.	
7—Gemshorn .. metal ..	4 feet.	14—Trompete	8 feet.

Choir, 12 Stops.

15—Bourdon..metal, except the lowest octave, which is of wood	16 feet tone.	19—Gedact..metal	8 feet tone.
		20—Octave	4 feet.
		21—Rohrflöte	4 feet tone.
		22—Nassat	$2\frac{2}{3}$ feet.
16—Principal..in front..	8 feet.	23—Super octave	2 feet.
17—Viola di Gamba .. Eng. tin to tenor C, last octave wood ..	8 feet.	24—Mixtur .. III ranks . $1\frac{1}{3}$, 1, and $\frac{2}{3}$ feet.	
		25—Æoline..wood	16 feet.
18—Flauto traverso . pear-tree wood	8 feet.	26—Hautbois .. treble ..	8 feet.

Pedal, 10 Stops.

27—Untersatz .. wood ..	32 feet tone.	32—Gedact bass . wood ..	8 feet tone.
28—Principal..in front..	16 feet.	33—Tertia .... wood ..	$6\frac{2}{5}$ feet.
29—Subbass.... wood ..	16 feet tone.	34—Super octave . metal .	4 feet.
30—Gross-Nasat..wood .	$10\frac{2}{3}$ feet.	35—Posaune	16 feet.
31—Octave .... wood ..	8 feet.	36—Trompete	8 feet.

75. Berlin.

The Organ in St. Mary's Church at Berlin was originally built in 1722 by Joachim Wagner, but has received subsequent additions at the hands of Buchholz, of Berlin. It now has 40 Sounding Stops, 3 Manuals, and Pedal of 9 Stops; and 6 pairs of Bellows, 9 feet long by $4\frac{1}{2}$ broad. The Stops are distributed as follows:

Great, 12 Stops.

1—Bourdon	16 feet tone.	7—Quinte	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	8—Super-octave	2 feet.
3—Rohrflote	8 feet tone.	9—Cornett.... V ranks.	
4—Viola di Gamba....	8 feet.	10—Scharf.... V ranks.	
5—Octave	4 feet.	11—Cymbel .. III ranks.	
6—Spitzflöte	4 feet.	12—Trompette	8 feet.

Choir, 9 Stops.

13—Salcional	8 feet.	18—Fugara	4 feet.
14—Gemshorn	8 feet.	19—Leiblich Flöte	4 feet tone.
15—Gedact	8 feet tone.	20—Nassard	$2\frac{2}{3}$ feet.
16—Quintaton	8 feet tone.	21—Super-octave	2 feet.
17—Octave	4 feet.		

Echo, 10 Stops.

22—Quintaton	16 feet tone.	28—Super-octave	2 feet.
23—Principal	8 feet.	29—Sifflote	1 foot.
24—Gedact	8 feet tone.	30 Mixture major / Mixture minor	IV ranks.
25—Octave	4 feet.		
26—Rohrflote	4 feet tone.	31 Hautbois discant / Fagott Bass	8 feet.
27—Nassard	$2\frac{2}{3}$ feet.		

Pedal, 9 Stops.

32—Principal..in front	16 feet.	37—Bass-flote	8 feet tone.
33—Subbass	16 feet tone.	38—Octave	4 feet.
34—Violon	16 feet.	39—Contra-Posaune	32 feet.
35—Gross Nassard	$10\frac{2}{3}$ feet.	40—Posaune	16 feet.
36—Gemshorn	8 feet.		

Accessory Stops.

1—Coupler, Choir to Great.	3—Coupler, Great to Pedal.
2—Coupler, Echo to Great.	4, 5, 6, 7—Four Wind-trunk Valves.

76. Berlin.

The Organ in the Garrison Church at Berlin was built in 1725 by Joachim Wagner, and contains 50 Stops, 3 Manuals, and Pedal of 12 Stops. The names and distribution of the Stops are as follow:

Great, 13 Stops.

1—Bourdon	16 feet tone.	8—Quinte	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	9—Octave	2 feet.
3—Rohrflote	8 feet tone.	10—Mixture	IV ranks.
4—Viol di Gamba	8 feet.	11—Cornett	V ranks.
5—Flauto Traverso	8 feet.	12—Scharf	VI ranks.
6—Octave	4 feet.	13—Fagott	16 feet.
7—Spitzflote	4 feet.		

Echo, 11 Stops.

14—Gedact	8 feet tone.	20—Flageolet	2 feet.
15—Quintaton	8 feet tone.	21—Terz	$1\frac{3}{5}$ foot.
16—Principal	4 feet.	22—Quint	$1\frac{1}{3}$ foot.
17—Rohrflote	4 feet tone.	23—Cymbel	IV ranks.
18—Nassat	$2\frac{2}{3}$ feet.	24—Vox Humana	8 feet tone.
19—Octave	2 feet.		

Choir, 13 Stops.

25—Quintaton	16 feet tone.	32—Octave	2 feet.
26—Principal	8 feet.	33—Wald-flote	2 feet.
27—Gedact	8 feet tone.	34—Sifflote	1 foot.
28—Salcional	8 feet.	35—Scharf	V ranks.
29—Octave	4 feet.	36—Cymbel	III ranks.
30—Fugara	4 feet.	37 Trompette discant / Trompetten-bass	8 feet.
31—Quinte	$2\frac{2}{3}$ feet.		

Pedal, 12 Stops.

38—Principal..in front.. 16 feet.
39—Violone.. ..... 16 feet.
40—Octave ..... 8 feet.
41—Gemshorn..... 8 feet.
42—Quinte ..... $5\frac{1}{3}$ feet.
43—Nacht-horn ..... 4 feet.
44—Quinte ..... $2\frac{2}{3}$ feet.
45—Mixture . VIII ranks.
46—Posaune..... 32 feet.
47—Posaune..... 16 feet.
48—Trompete..... 8 feet.
49—Clarion..... 4 feet.

77. Kronstadt.

The fine Organ in the Cathedral Church at Kronstadt was built from the plans of C. Buchholz, of Berlin, in 1839. It contains 63 Sounding Stops, 4 Manuals, and Pedal of 17 Stops; and 9 large pairs of Bellows. The Stops are distributed as follows:

Great, 15 Stops.

1—Principal ..... 16 feet.
2—Quintaton..... 16 feet tone.
3—Principal ..... 8 feet.
4—Rohrflote..... 8 feet tone.
5—Gemshorn ..... 8 feet.
6—Viol di Gamba .... 8 feet.
7—Nassat ..... $5\frac{1}{3}$ feet.
8—Octave ..... 4 feet.
9—Spitzflote ..... 4 feet.
10—Waldflote..... 4 feet.
11—Quint..... $2\frac{2}{3}$ feet.
12—Super octave..... 2 feet.
13—Cornett .. V ranks.
14—Scharf .. V ranks.
15—Cymbel.. V ranks.

Echo, 13 Stops.

16—Bourdon..... 16 feet tone.
17—Principal ..... 8 feet.
18—Gedact ..... 8 feet tone.
19—Salcional ..... 8 feet.
20—Hohlflote..... 8 feet.
21—Quintaton..... 8 feet tone.
22—Octave ..... 4 feet.
23—Rohrflote ..... 4 feet tone.
24—Fugara ..... 4 feet.
25—Nasat ..... $2\frac{2}{3}$ feet.
26—Super-octave . II ranks. 2 feet.
27—Mixture .... V ranks.
28—Hautbois ..... 8 feet.

Choir, 11 Stops.

29—Salcional ..... 16 feet.
30—Principal ..... 8 feet.
31—Gedact ..... 8 feet tone.
32—Viol di Gamba .... 8 feet.
33—Flauto Traverso.... 8 feet.
34—Octave ..... 4 feet.
35—Viol d'amour ..... 4 feet.
36—Flauto dolce ..... 4 feet.
37—Gemshorn Quinta .. $2\frac{2}{3}$ feet.
38—Decima Quinta .... 2 feet.
39—Progressio harmonica, III to V ranks.

Reed-work Manual, 7 Stops.

40—Fagott..... 16 feet.
41—Trompette ..... 8 feet.
42—Clarionetto..... 8 feet.
43—Vox Angelica..... 8 feet.
44—Rohrflote ..... 8 feet tone.
45—Violino ..... 8 feet.
46—Principal ..... 4 feet.
Nos. 5, 6, & 7, are Lip Stops.

Pedal, 17 Stops.

47—Principal ..... 32 feet.
48—Untersatz ..... 32 feet tone.
49—Principal ..... 16 feet.
50—Subbass..... 16 feet tone.
51—Violone ..... 16 feet.
52—Nassat..... $10\frac{2}{3}$ feet.
53—Principal ..... 8 feet.
54—Bass-Flote..... 8 feet tone.
55—Violone ..... 8 feet.
56—Gemshorn ..... 8 feet.
57—Quinte ..... $5\frac{1}{3}$ feet.
58—Octave ..... 4 feet.
59—Mixture..IV ranks.
60—Contra-Posaune .... 32 feet.
61—Posaune..... 16 feet.
62—Trompette..... 8 feet.
63—Cornette..... 4 feet.

Accessory Stops, Movements, &c.

1, 2, 3—Three Manual Couplers.
4—Pedal Coupler.
5 to 9—Five Wind-trunk Valves.

Compass.

Manuals, CC to g^3 in altissimo, 56 notes. | Pedal, CCC to fiddle g, 32 notes.

78. Leipzig.

The Organ in the University Church at Leipzig is a very fine instrument; but the touch is so heavy, that playing on it is a great labour. It has 3 Manuals and Pedal, and 58 Stops, of which latter the following is an enumeration:

Great, 18 Stops.

1—Principal	16 feet.	10—Quinta	$2\frac{2}{3}$ feet.
2—Bourdon	16 feet tone.	11—Octave	2 feet.
3—Octave	8 feet.	12—Tertia	$1\frac{3}{5}$ foot.
4—Gemshorn	8 feet.	13—Mixtur	VI ranks.
5—Gamba	8 feet.	14—Cymbal	III ranks.
6—Rohrflote	8 feet tone.	15—Cornet	V ranks.
7—Quinta	$5\frac{1}{3}$ feet.	16—Fagotto	16 feet.
8—Octave	4 feet.	17—Trompete	8 feet.
9—Gemshorn	4 feet.	18—Clairon	4 feet.

Choir, 12 Stops.

19—Salicional	8 feet.	25—Nassat	$2\frac{2}{3}$ feet.
20—Flote	8 feet.	26—Octave	2 feet.
21—Rohrflote	8 feet tone.	27—Quinta	$1\frac{1}{3}$ foot.
22—Principal	4 feet.	28—Flageolet	1 foot.
23—Flote	4 feet.	29—Mixtur	IV ranks.
24—Gedact	4 feet tone.	30—Oboe	8 feet.

Echo, 14 Stops.

31—Quintadon	16 feet tone.	38—Rohrflote	4 feet tone.
32—Principal	8 feet.	39—Quinta	$2\frac{2}{3}$ feet.
33—Spitzflote	8 feet.	40—Octave	2 feet.
34—Fugara	8 feet.	41—Mixtur	V ranks.
35—Quintadon	8 feet tone.	42—Cornet	III ranks.
36—Gedact	8 feet tone.	43—Physharmonica	8 feet tone.
37—Octave	4 feet.	44—Vox Humana	8 feet tone.

Pedal, 14 Stops.

45—Principal	32 feet.	52—Quinta	$5\frac{1}{3}$ feet.
46—Octave	16 feet.	53—Octave	4 feet.
47—Violone	16 feet.	54—Mixtur	VI ranks.
48—Subbass	16 feet tone.	55—Posaune	32 feet.
49—Quinta	$10\frac{2}{3}$ feet.	56—Posaune	16 feet.
50—Octave	8 feet.	57—Trompete	8 feet.
51—Violoncello	8 feet.	58—Clairon	4 feet.

Accessory Stops, Movements, &c.

1—Echo to Great.
2—Choir to Great.
3—Great to Pedal.
4—Tremulant Echo.
5, 6, 7—Three Wind-trunk Valves.

Compass.

Manuals, CC to e^3 in alt. | Pedal, CCC to tenor e.

Dresden.

The five principal Churches in the city of Dresden all contain very fine Organs, four of which are by Silbermann, one of the most renowned German Organ-builders of the last century, and whose name (Silverman) very well describes the sparkling and chaste tone of his instruments. In the "Ramble among the Musicians of Germany," a most interesting volume, written by Mr. Edward Holmes, and published in 1828, the author, in describing these instruments, observes —"In glancing over the list of contents, the musical reader may please his imagination by fancying with what effect a piece of florid and artful counterpoint comes out of a German Organ, where the player sits with a flood of sound ready to the touch of his fingers, and store of thunder lying harmless at his feet. The thickness, depth, and independence of the Pedals, here vindicate supremely the poetical ascendancy of the fugue over every other class of musical composition; and in slow subjects, when the bass rolls in its ponderousness—there is no disputing it—it is like the *fiat* of the Omnipotent. As a matter of science, it is worthy consideration how far the structure of our Organs might be improved by uniting the sweet *Cathedral* quality of tone for which those of the Temple, Westminster Abbey, &c. are noted, with the magnificence of Silbermann. If there lived now in England a mechanic capable of associating the best points of the two, a perfect specimen of the kind would be the result." Since the above excellent observations on the effect of the Dresden Organs were written, a considerable advance has been made in the art of Organ-building in England.

The largest of Silbermann's four Dresden Organs stands in the Royal Catholic Church.

79. Dresden.

The fine Organ in the Royal Catholic Church is esteemed Silbermann's masterpiece. Gottfried Silbermann died during its progress, and it was finished by his nephew, John Daniel Silbermann, of Strasbourg, who had assisted him in the work; and was completed and erected in the year 1754. It has 48 Stops, distributed in the following manner:

Great, 16 Stops.

1—Principal	16 feet.	9—Octave	2 feet.
2—Bourdon	16 feet tone.	10—Tertia	$1\frac{3}{5}$ foot.
3—Principal	8 feet.	11—Mixtur	IV ranks.
4—Viola di Gamba	8 feet.	12—Cymbel	III ranks.
5—Rohrflote	8 feet tone.	13—Cornet	V ranks.
6—Octave	4 feet.	14—Fagott	16 feet.
7—Spitzflote	4 feet.	15—Trompete	8 feet.
8—Quinta	$2\frac{2}{3}$ feet.	16—Clarin	4 feet.

Echo, 14 Stops.

17—Quintaton	16 feet tone.	24—Nassat	$2\frac{2}{3}$ feet.
18—Principal	8 feet.	25—Octave	2 feet.
19—Gedact	8 feet tone.	26—Tertia	$1\frac{3}{5}$ foot.
20—Quintaton	8 feet tone.	27—Flageolet	1 foot.
21—Unda Maris	8 feet tone.	28—Mixtur	IV ranks.
22—Octava	4 feet.	29—Echo	V ranks.
23—Rohrflote	4 feet tone.	30—Vox humana	8 feet tone.

Choir, 10 Stops.

31—Gedact	8 feet tone.	36—Quinta	1⅓ foot.
32—Principal	4 feet.	37—Sifflote	1 foot.
33—Rohrflote	4 feet tone.	38—Mixtur....III ranks.	
34—Nassat	2⅔ feet.	39—Sesquialtera. II ranks.	
35—Octave	2 feet.	40—Chalmeaux	8 feet tone.

Pedal, 8 Stops.

41—Untersatz	32 feet tone.	45—Mixtur..VI ranks.	
42—Principal	16 feet.	46—Pausan	16 feet.
43—Octav Bass	8 feet.	47—Trompete	8 feet.
44—Octava	4 feet.	48—Clarin	4 feet.

Accessory Stops, &c.

1—Echo to Great.	3—Tremulant Echo.
2—Great to Pedal.	4—Tremulant Great.

Compass.

Manuals, CC to d^3 in alt. | Pedal, CCC to tenor c.

80. Dresden.

The Organ in the Royal Church of the Evangelists, at Dresden, was completed and erected by Silbermann in the year 1720. It has 32 Sounding Stops, distributed among 2 Manuals and Pedal, in the following manner:

Great, 14 Stops.

1—Bordun	16 feet tone.	8—Octave	2 feet.
2—Principal	8 feet.	9—Tertia	2 feet.
3—Spitzflote	8 feet.	10—Mixtur, IV ranks.	
4—Rohrflote	8 feet tone.	11—Cymbal, III ranks.	
5—Octave	4 feet.	12—Cornett, IV ranks.	
6—Gemshorn	4 feet.	13—Trompete	8 feet.
7—Quinte	2⅔ feet.	14—Clarin	4 feet.

Choir, 13 Stops.

15—Quintaton	16 feet tone.	22—Nassat	2⅔ feet.
16—Principal	8 feet.	23—Octave	2 feet.
17—Gedact	8 feet tone.	24—Quinte	1⅓ feet.
18—Quintaton	8 feet tone.	25—Sifflote	1 foot.
19—Unda Maris	8 feet tone.	26—Mixtur, III ranks.	
20—Octave	4 feet.	27—Vox humana	8 feet tone.
21—Rohrflote	4 feet tone.		

Pedal, 5 Stops.

28—Principal-bass	16 feet.	31—Pausan	16 feet.
29—Sub-bass	16 feet tone.	32—Trompete	8 feet.
30—Violone	8 feet.		

81. Dresden.

The Organ in St. Mary's Church was completed in the year 1736. It has 43 Stops, 3 Manuals, and Pedal of 8 Stops, including a Covered Stop of 32-feet tone. The distribution of the Stops is as follows:

Great, 14 Stops.

1—Principal	16 feet.	8—Octava	2 feet.
2—Octave	8 feet.	9—Tertia	1⅗ foot.
3—Viola di Gamba	8 feet.	10—Mixture, IV ranks.	
4—Rohrflote	8 feet tone.	11—Cymbal, III ranks.	
5—Octave	4 feet.	12—Cornet, V ranks.	
6—Spitzflote	4 feet.	13—Fagott	16 feet.
7—Quinta	2⅔ feet.	14—Trompete	8 feet.

Echo, 11 Stops.

15—Quintadena	16 feet tone.	21—Nassat	2⅔ feet.
16—Principal	8 feet.	22—Octava	2 feet.
17—Gedact	8 feet tone.	23—Tertia	1⅗ foot.
18—Quintaton	8 feet tone.	24—Mixtur, IV ranks.	
19—Octava	4 feet.	25—Vox Humana	8 feet tone.
20—Rohrflote	4 feet tone.		

Choir, 10 Stops.

26—Gedact	8 feet tone.	31—Gemshorn	2 feet.
27—Principal	4 feet	32—Quinta	1⅓ foot.
28—Rohrflote	4 feet tone.	33—Sifflote	1 foot.
29—Nassat	2⅔ feet.	34—Mixtur, III ranks.	
30—Octava	2 feet.	35—Chalmeaux	8 feet tone.

Pedal, 8 Stops.

36—Untersatz	32 feet tone.	40—Mixtur, VI ranks.	
37—Principal bass	16 feet.	41—Pausan	16 feet.
38—Octave-bass	8 feet.	42—Trompete	8 feet.
39—Octave	4 feet.	43—Clarin	4 feet.

Neben-Register.

1—Tremulant.	4—Coppel.
2—Schwebung.	5—Klingel.
3—Bass Veutil.	

82. Dresden.

The Organ in the Church of St. Sophia at Dresden was built by Silbermann, about the year 1750, and is a very fine Instrument. It contains 33 Stops, which are distributed among 2 Manuals and Pedal in the following manner:

Great, 15 Stops.

1—Bourdon	16 feet tone.	9—Octave	2 feet.
2—Quintaton	16 feet tone.	10—Terz	1⅗ foot.
3—Principal	8 feet.	11—Mixtur, V ranks.	
4—Spitzflote	8 feet.	12—Cymbel, III ranks.	
5—Rohrflote	8 feet tone.	13—Cornet, V ranks.	
6—Octave	4 feet.	14 { Trompet discant / Trompet-bass }	8 feet.
7—Gemshorn	4 feet.		
8—Quint	2⅔ feet.	15 Clarin	4 feet.

Choir, 12 Stops.

16—Quintaton	16 feet tone.	22—Rohrflote	4 feet tone.
17—Principal	8 feet.	23—Nasat	$2\frac{2}{3}$ feet.
18—Gedact	8 feet tone.	24—Octave	2 feet.
19—Quintaton	8 feet tone.	25—Super-octave	1 foot.
20—Unda Maris	8 feet tone.	26—Mixtur, III ranks.	
21—Octave	4 feet.	27—Vox Humana	8 feet tone.

Pedal, 6 Stops.

28—Principal	16 feet.	31—Cornet, VIII ranks.	
29—Bourdon	16 feet tone.	32—Posaune	16 feet.
30—Sub-bass	16 feet.	33—Trompet	8 feet.

Accessory Stops, &c.	Compass.
1—Coupler, Choir to Great.	Manuals, CC to d^3 in alt.
2—Coupler, Great to Pedal.	Pedal, CCC to tenor c.
3—Tremulant to Choir.	

83. Dresden.

The Organ in the Church of the Holy Cross, built by Jagermann of Dresden, is altogether a very fine Instrument. It is the largest in the City, and contains 56 Sounding Stops, 3 Manuals, and Pedal of 32 feet. The following is a list of its contents:

Great, 16 Stops.

1—Principal	16 feet.	9—Quinte	$2\frac{2}{3}$ feet.
2—Bourdon	16 feet tone.	10—Octave	2 feet.
3—Gross Octave	8 feet.	11—Terz	$1\frac{3}{5}$ foot.
4—Gamba	8 feet.	12—Mixtur, VI ranks.	
5—Gemshorn	8 feet.	13—Cymbel, V ranks.	
6—Rohrflote	8 feet tone.	14—Cornet, V ranks.	
7—Octave	4 feet.	15—Fagotto	16 feet.
8—Gemshorn	4 feet.	16—Trompete	8 feet.

Choir, 10 Stops.

17—Leiblich Gedact	8 feet tone.	22—Octave	2 feet.
18—Rohrflote	8 feet tone.	23—Quinta	$1\frac{1}{3}$ foot.
19—Principal	4 feet.	24—Sifflote	1 foot.
20—Rohrflote	4 feet tone.	25—Mixtur, IV ranks.	
21—Nasat	$2\frac{2}{3}$ feet.	26—Krum-horn	8 feet tone.

Echo, 14 Stops.

27—Quintaton	16 feet tone.	34—Quinta	$2\frac{2}{3}$ feet.
28—Principal	8 feet.	35—Octave	2 feet.
29—Schwiegel	8 feet.	36—Flageolet	1 foot.
30—Gedact	8 feet tone.	37—Mixtur, V ranks.	
31—Quintaton	8 feet tone.	38—Cymbel, IV ranks.	
32—Octave	4 feet.	39—Cornet, V ranks.	
33—Rohrflote	4 feet tone.	40—Vox Humana	8 feet tone.

Pedal, 16 Stops.

41—Gross Principal Bass 32 feet.	49—Koppel . . . . . 8 feet.
42—Principal Bass. . . . . 16 feet.	50—Quinta Bass. . . . . $5\frac{1}{3}$ feet.
43—Violone Bass. . . . . 16 feet.	51—Octave Bass . . . . . 4 feet.
44—Sub-bass. . . . . 16 feet tone.	52—Octave Bass . . . . . 2 feet.
45—Gedact Quint Bass..$10\frac{2}{3}$ feet tone.	53—Mixtur Bass, VI ranks.
46—Principal Bass. . . . . 8 feet.	54—Posaune Bass. . . . . 16 feet.
47—Quintaton Bass. . . . . 8 feet tone.	55—Trompete Bass . . . . 8 feet.
48—Violon Bass. . . . . 8 feet.	56—Clarin Bass. . . . . 4 feet.

Accessory Stops, &c.

1—Coupler, Great to Pedal.	3—Tremulant Echo.
2—Coupler, Echo to Great.	4, 5, 6, Three Trunk-valves.

Compass.

Manuals, CC to d^3 in alt.	Pedal, CCC to Tenor d.

84. Freiberg in Saxony.

The Cathedral at Freiberg, in Saxony, contains one of Silbermann's largest and finest Organs; comprising 45 Stops, 3 Manuals, and a Pedal of 10 Stops. The following is a list of the several Stops contained therein:

Great, 13 Stops.

1—Bourdon . wood in the Bass . . . . . 16 feet tone.	7—Superoctave . . . . .tin 2 feet.
2—Principal. . .Eng. tin. 8 feet.	8—Tierce . . . . . $1\frac{3}{5}$ foot.
3—Viola da Gamba..tin 8 feet.	9—Furniture..IV ranks Eng. tin.
4—Rohrflote. . . . . .tin 8 feet tone.	10—Cymbale . .III ranks Eng. tin.
5—Octave. . . . . .tin 4 feet.	11—Cornet . . . .V ranks Eng. tin.
6—Quinte. . . . . .tin $2\frac{2}{3}$ feet.	12—Trompete . . Eng. tin 8 feet.
	13—Clairon. . . . Eng. tin 4 feet.

Choir, 13 Stops.

14—Quintaton . .Eng. tin 16 feet tone.	21—Tierce . . . .Eng. tin, $1\frac{3}{5}$ foot.
15—Principal . . .Eng. tin 8 feet.	22—Fourniture, III ranks Eng. tin.
16—Bourdon, metal treble, wood bass. . . . . 8 feet tone.	23—Cymbale . .III ranks Eng. tin.
	24—Echo Cornet, V ranks metal.
17—Octave . . . .Eng. tin 4 feet.	25—Cromorne. . .Eng. tin 8 feet tone.
18—Flute. . . . . .Eng. tin 4 feet.	26—Voix Humaine, Eng. tin. . . . . 8 feet tone.
19—Nazard. . . . . .metal $2\frac{2}{3}$ feet.	
20—Super-octave Eng. tin 2 feet.	

Echo, 9 Stops.

27—Bourdon. . . . .metal 8 feet tone.	32—Tierce. . . . . .metal $1\frac{3}{5}$ foot.
28—Principal. . .Eng. tin 4 feet.	33—Quinte. . . . .Eng. tin $1\frac{1}{3}$ foot.
29—Rohrflote. . . Eng. tin 4 feet tone.	34—Sifflet. . . . . Eng. tin 1 foot.
30—Nasard. . . . . .metal $2\frac{2}{3}$ feet.	35—Fourniture, III ranks, Eng. tin.
31—Octave. . . . .Eng. tin 2 feet.	

Pedal, 10 Stops.

36—Untersatz . . . . wood 32 feet tone.
37—Principal bass . . Eng. tin . . . . . 16 feet.
38—Sous-bass . . . . . wood 16 feet tone.
39—Octave . . . . . wood 16 feet.
40—Octave-bass . . . . . tin 8 feet.
41—Super-octave . . . . tin 4 feet.
42—Fourniture, VI ranks, tin.
43—Bombarde . . . . . tin 16 feet.
44—Trompet . . . . . tin 8 feet.
45—Clairon . . . . . tin 4 feet.

Accessory Stops, &c.

Coupler, Great to Pedal.
Wind-trunk Valves.
Two Tremulants.
Six Bellows.

85. Prague.

The Organ in the Church of St. Dominico, at Prague, is a very large and most interesting Instrument. It has 4 Manuals and Pedal, and 71 Stops, distributed in the following manner :

Great, 14 Stops.

1—Principal . . . . . 16 feet.
2—Gross-gedackt . . . . . 16 feet tone.
3—Octave . . . . . 8 feet.
4—Gedackt . . . . . 8 feet tone.
5—Octave . . . . . 4 feet.
6—Offenflote . . . . . 4 feet.
7—Quinte . . . . . $2\frac{2}{3}$ feet.
8—Super-octave . . . . . 2 feet.
9—Spitzflote . . . . . 2 feet.
10—Sexte . . . . . $2\frac{2}{3}$ feet.
11—Quinte . . . . . $1\frac{1}{3}$ foot.
12—Kuzial-flote . . . . . 1 foot.
13—Mixtur . . X ranks.
14—Cymbel, IV ranks.

Echo, 12 Stops.

1—Quintaton . . . . . 16 feet tone.
2—Surdun . . . . . 16 feet tone.
3—Principal . . . . . 8 feet.
4—Gemshorn . . . . . 8 feet.
5—Hohlflote . . . . . 8 feet.
6—Octave . . . . . 4 feet.
7—Nachthorn . . . . . 4 feet.
8—Super-octave . . . . . 2 feet.
9—Rauschpfeife . III ranks. $2\frac{2}{3}$ feet.
10—Koppel . . quint . . . . $1\frac{1}{3}$ foot.
11—Mixtur—VI ranks.
12—Krummhorn . . . . . 8 feet tone.

Inside Choir, 9 Stops.

1—Gedact . . . . . 8 feet tone.
2—Gedact . . . . . 4 feet tone.
3—Quintaton . . . . . 4 feet tone.
4—Octave . . . . . 2 feet.
5—Quinte . . . . . $1\frac{1}{3}$ foot.
6—Sedecima . . . . . 1 foot.
7—Cymbel, III ranks.
8—Jungfernregal . . . . . 16 feet.
9—Regal . . . . . 8 feet.

Front Choir, 18 Stops.

1—Principal . . . . . 16 feet.
2—Salicional . . . . . 16 feet.
3—Principal . . . . . 8 feet.
4—Rohrflote . . . . . 8 feet tone.
5—Quintaton . . . . . 8 feet tone.
6—Octave . . . . . 4 feet.
7—Blockflote . . . . . 4 feet.
8—Querflote . . . . . 4 feet.
9—Quint . . . . . $2\frac{2}{3}$ feet.
10—Super-octave . . . . . 2 feet.
11—Gemshorn . . . . . 2 feet.
12—Waldflote . . . . . 2 feet.
13—Sexte . . . . . $1\frac{3}{5}$ foot.
14—Sifflote . . . . . 1 foot.
15—Mixtur . . V ranks.
16—Cornett . III ranks.
17—Dulcian . . of wood . . 16 feet.
18—Trompete . . . . . 8 feet.

Pedal, 18 Stops.

1—Principal..... 32 feet.
2—Octave..... 16 feet.
3—Principal..... 16 feet.
4—Salicional..... 16 feet.
5—Octave..... 8 feet.
6—Gross-Quinte..... $5\frac{1}{3}$ feet.
7—Super-octave..... 4 feet.
8—Nachthorn..... 4 feet.
9—Spitzflote..... 2 feet.
10—Koppel..... 2 feet.
11—Bauerflote ..... 1 foot.
12—Quinte.....III ranks.
Super-octave....II ranks.
Tertian... ....II ranks.
Koppel.....III ranks.
13—Mixtur.....VIII ranks.
14—Posaune..... 32 feet.
15—Posaune..... 16 feet.
16—Dulcian..... 16 feet.
17—Trompete..... 8 feet.
18—Schalmei..... 4 feet.

86. Goerlitz.

The Organ in the Church of St. Peter and St. Paul, at Goerlitz, in Upper Lusatia, was built by Eugenius Casparini, and his son, Adam Horatius, in six years; and was consecrated, by a solemn service, August 19th, 1703. It has 82 Stops, 55 of which are whole Stops; and 3270 Pipes, 522 of which are of metal. The front of the Organ case shows above 280 Pipes of polished Tin, the largest of which is the FFFF in the Pedal, 24 feet long. The Organ has 3 Manuals, and 12 pairs of Bellows. The following is an enumeration of the whole Stops:

Great, 16 Stops.

1—Principal..in front.. 16 feet.
2—Octave Principal.... 8 feet.
3—Viol di Gamba .... 8 feet.
4—Quintadena ..... 8 feet tone.
5—Gedact..... 8 feet tone.
6—Flote Quinte..... $5\frac{1}{3}$ feet.
7—Super-octave..... 4 feet.
8—Salicional..... 4 feet.
9—Quinte..... $2\frac{2}{3}$ feet.
10—Sedecima ..... 2 feet.
11—Quinte..... $1\frac{1}{3}$ foot.
12—Mixtur .... V ranks.
13—Rauschpfeif.III ranks.
14—Bombard ..... 16 feet.
15—Trompete..... 8 feet.
16—Vox humana ..... 8 feet tone.

Echo, 8 Stops.

17—Gedact..... 8 feet tone.
18—Principal ..... 4 feet.
19—Octave..... 2 feet.
20—Flageolet ..... 2 feet.
21—Nason..... $1\frac{1}{3}$ foot.
22—Sedecima..... 1 foot.
23—Mixtur..III ranks.
24—Hautbois ..... 8 feet.

Choir, 12 Stops.

25—Quintadena. cypress-wood..... 16 feet tone.
26—Principal ..... 8 feet.
27—Unda maris. cypress-wood..... 8 feet tone.
28—Octave ..... 4 feet.
29—Flote..... 4 feet tone.
30—Quinte ..... $2\frac{2}{3}$ feet.
31—Sedecima..... 2 feet.
32—Flageolet ..... 2 feet.
33—Super-sedecima.... 1 foot.
34—Cornet .. V ranks.
35—Mixtur.. II ranks.
36—Cymbel.. II ranks.

Pedal, 19 Stops.

37—Gross Principal..tin. 32 feet.
38—Violon-bass ..... 16 feet.
39—Bourdon..... 16 feet tone.
40—Tubalflote..... 8 feet.
41—Quintadena ..... 8 feet tone.
42—Quinte..... 5⅓ feet.
43—Super-octave ..... 4 feet.
44—Virgin royal ..... 4 feet.
45—Tubalflote ..... 4 feet.
46—Tubalflote ..... 2 feet.
47—Rustic ..... 2 feet.
48—Mixtur..V ranks.
49—Scharf..II ranks.
50—Cymbel. II ranks.
51—Posaune ..... 16 feet.
52—Fagott..... 16 feet.
53—Trompete ..... 8 feet.
54—Chalmey-bass .... 8 feet tone.
55—Corno ..... 8 feet.

Compass of Pedals..2 Octaves, from CCC to Tenor c.

87. Goerlitz.

The Organ in St. Mary's Church, at Goerlitz, has 15 Sounding Stops, and was built by Buckow, in 1838.

Great, 8 Stops.

1—Bourdon..wood .... 16 feet tone.
2—Principal .. 14 loth. Eng. tin..in front. 8 feet.
3—Flauto grave . wood . 8 feet.
4—Principal-octave..14 loth. English tin .. in front ..... 4 feet.
5—Gemshorn quint..12 loth. English tin .. 2⅔ feet.
6—Super-octave. 12 loth. Eng. tin ..... 2 feet.
7—Mixtur. 12 loth. Eng. tin..IV ranks.... 2 feet.
8—Cornetti to fiddle G.. III ranks..... 8 feet.
9—Slider for a Trompete..... 8 feet.

Choir, 4 Stops.

10—Viola di Gamba..12 loth. Eng. tin .... 8 feet.
11—Flût douce..wood.. 8 feet tone.
12—Dolciano..wood.... 8 feet.
13—Flût d'amour. wood. 4 feet tone.

Pedal, 3 Stops.

14—Violon..pine-wood.. 16 feet.
15—Violoncello. pine-wood 8 feet.
16—Posaune ..... 16 feet.

Accessory Stops.

1—Coupler, Choir to Great.
2—Coupler, Great to Pedal.

88. Liegnitz.

The Organ in the Church of St. Peter and St. Paul, at Liegnitz, was erected by Buckow, in the year 1839. It has 3 Manuals and Pedal, and 42 Sounding Stops, the names and distribution of which are as follow:

Great, 13 Stops.

1—Bourdon..wood .... 16 feet tone.
2—Principal..¾ tin.... 8 feet.
3—Gemshorn..tin.... 8 feet.
4—Viola d'amour..tin. 8 feet.
5—Flauto grave..... 8 feet.
6—Flaut douce..wood.. 8 feet.
7—Octave..tin..... 4 feet.
8—Flauto dolce..metal. 4 feet.
9—Quint..metal..... 2⅔ feet.
10—Super-octave. metal. 2 feet.
11—Flautino..metal.... 2 feet.
12—Progressio..III, IV, and V ranks .... 2 feet.
13—Cornet..III ranks.. 5⅓, 4, and 3⅕ feet.

Choir, 8 Stops.

14—Quintaton . . tin ; the great octave of wood .	16 feet tone.	18—Piffaro . . $\frac{3}{4}$ Eng. tin . .	4 feet.
15—Salicional . $\frac{7}{8}$ Eng. tin .	8 feet.	19—Flautino . . $\frac{3}{4}$ Eng. tin .	2 feet.
16—Pyramid-flote . wood .	8 feet.	20—Cornet . . III ranks, Eng. tin	$2\frac{2}{3}$, 2, and $1\frac{3}{5}$ foot.
17—Prestant . $\frac{7}{8}$ Eng. tin .	4 feet.	21—Oboe	8 feet.

Echo, 9 Stops.

22—Prestant . . $\frac{3}{4}$ tin	8 feet.	26—Flauto amoroso . metal	4 feet.
23—Viola di Gamba . $\frac{7}{8}$ tin.	8 feet.	27—Spitzflote . . quint, tin .	$2\frac{2}{3}$ feet.
24—Flaut amabile . metal, the bass octave of wood	8 feet.	28—Octave . . . . . tin .	2 feet.
		29—Flauto Piccolo . . tin .	1 foot.
		30—Mixtur . . III ranks . .	$1\frac{1}{3}$ foot.
25—Principal . . $\frac{7}{8}$ Eng. tin.	4 feet.		

Pedal, 12 Stops.

31—Principal . . polished tin, in front	16 feet.	37—Bass-flote . . wood . .	8 feet tone.
32—Violon . . . . oak	16 feet.	38—Quint . tin and wood .	$5\frac{1}{3}$ feet.
33—Prestant . . oak	16 feet.	39—Super-octave	4 feet.
34—Sub-bass . . oak	16 feet tone.	40—Octave	2 feet.
35—Principal	8 feet.	41—Posaune	16 feet.
36—Violoncello . . wood . .	8 feet.	42—Trompete	8 feet.

Accessory Stops.

1—Coupler, Choir to Great.	3—Coupler, Great to Pedal.
2—Coupler, Echo to Great.	4, 5, 6, 7—Four Wind-trunk Valves.

89. Breslau.

The Cathedral Church of St. John, at Breslau, contains no less than 3 distinct Organs; one in the Nave, a second in the Choir, and the third in one of the small Chapels. The Great Organ has 60 Sounding Stops, 3 Manuals, and a Pedal of 18 Stops; 4,700 Pipes, and 12 Bellows. The following are the details of the largest Organ :

Great, 16 Stops.

1—Principal . in front, tin .	16 feet.	9—Super-octave . metal .	4 feet.
2—Quintaton . . metal . .	16 feet tone.	10—Rohrflote . . metal . .	4 feet tone.
3—Octave . . in front, tin .	8 feet.	11—Gemshorn . . metal . .	4 feet.
4—Gemshorn . . metal . .	8 feet.	12—Quinta . . . . metal . .	$2\frac{2}{3}$ feet.
5—Salicet . . . . metal . .	8 feet.	13—Sedecima . metal . .	2 feet.
6—Quintaton . . metal . .	8 feet tone.	14—Scharf . . metal, IV ranks.	
7—Flaut major . wood . .	8 feet.	15—Mixtur . metal, VII ranks.	
8—Quinta . . . . metal . .	$5\frac{1}{3}$ feet.	16—Trompete . . . . tin . .	8 feet.

Echo, 14 Stops.

17—Bourdon . maple-wood.	16 feet tone.	24—Spitzflote . . metal . .	4 feet.
18—Principal . . . . tin . .	8 feet.	25—Doppel Rohrflote . . . . maple	4 feet tone.
19—Salicet . . . . . tin . .	8 feet.	26—Nassat . . . . metal . .	$2\frac{2}{3}$ feet.
20—Flaut allemande . . . . metal	8 feet.	27—Super-octave . . metal .	2 feet.
21—Doppel Rohrflote . . . . maple	8 feet tone.	28—Cymbel . metal . III ranks.	
22—Octave . . . . . tin . .	4 feet.	29—Mixtur . metal . VI ranks.	
23—Salicet . . . . . tin . .	4 feet.	30—Clarinett . . tin	8 feet tone.

Choir, 12 Stops.

31—Principal . in front, tin. 8 feet.
32—Gamba . . . . metal . . 8 feet.
33—Flaut traverse . . . . . 8 feet.
34—Quintaton . . . . . 8 feet tone.
35—Flaut douce . . . . . 8 feet.
36—Flaut major . . . . . 8 feet.
37—Octave . . . . metal . . 4 feet.
38—Flaut minor . wood . . 4 feet.
39—Quinta . . . . metal . . $2\frac{2}{3}$ feet.
40—Super octave . metal . 2 feet.
41—Mixtur . metal . IV ranks.
42—Obois . . metal . . . . . 8 feet.

Pedal, 18 Stops.

43—Principal . of tin to FFFF sharp, 23 feet, and in front; the lower Pipes of wood . . . . . 32 feet.
44—Octave . . . . metal . . 16 feet.
45—Violon . . . . wood . . 16 feet.
46—Gamba . . . . wood . . 16 feet.
47—Subbass . . . . of oak . . 16 feet tone.
48—Quintaton . . of oak . . 16 feet tone.
49—Gemshornquint . metal . $10\frac{2}{3}$ feet.
50—Principal . . . . tin . . 8 feet.
51—Gemshorn . . metal . . 8 feet.
52—Violoncello . . wood . . 8 feet.
53—Doppelflote . of oak . . 8 feet tone.
54—Quinta . . . . metal . . $5\frac{1}{3}$ feet.
55—Sedecima . . metal . . 4 feet.
56—Nachthorn . . of oak . . 4 feet.
57—Posaun . . . . wood . . 32 feet.
58—Posaun . . . . wood . . 16 feet.
59—Fagott . . . . wood . . 16 feet.
60—Trompete . . tin . . 8 feet.

Accessory Stops, &c.

1—Echo to Great.
2—Choir to Great.
3—Great to Pedal.
4—Wind-valve to Great.
5—Wind-valve to Choir.
6—Wind-valve to Echo.
7—Wind-valve to great Pedal Sound-board.
8—Wind-valve to Pedal Reed-work and 32 feet Principal.

Compass.

Manuals, CC to f^3 in alt. | Pedal, CCC to Tenor c.

90. Breslau.

The Choir Organ :

Manual, 9 Stops.

1—Principal . . . . . 8 feet.
2—Gamba . . . . . 8 feet.
3—Flaut allemande . . . . 8 feet.
4—Flaut major . . . . . 8 feet tone.
5—Octave . . . . . 4 feet.
6—Doppel Rohrflote . . . . 4 feet tone.
7—Nasat quint . . . . . $2\frac{2}{3}$ feet.
8—Super octave . . . . . 2 feet.
9—Mixtur . . IV ranks.

Pedal, 3 Stops.

10—Subbass . . . . . 16 feet tone.
11—Octaven bass . . . . . 8 feet.
12—Super octave . . . . . 4 feet.

Compass.

Manual, CC to f^3 in alt.
Pedal, CCC to tenor c.
Coupler, Manual to Pedal.

90—a. Breslau.

The little Organ in one of the Chapels :

1—Salicet . . . . . 8 feet.
2—Quintaton . . . . . 8 feet tone.
3—Principal . . . . . 4 feet.
4—Flaut amabile . . . . 4 feet.
5—Flaut allemande . . . . 4 feet.
6—Quint . . . . . $2\frac{2}{3}$ feet.
7—Super octave . . . . . 2 feet.
8—Mixtur . . III ranks.

91. Breslau.

The old part of the large Organ in the Church of St. Mary Magdalen, at Breslau, is the work of Joh. Rôder, of Berlin, who constructed it in 1725; to whose work additions were made by Engler, in 1821. The Organ has now 55 Sounding Stops, 3 Manuals, and Pedal of 16 Stops; 3415 Pipes, and 10 pairs of Bellows. There is, besides the large Organ, a small one in the Choir, of 12 Stops. Contents of the large Organ:

Great, 14 Stops.

1—Contra-Principal . . of tin, in front	16 feet.	7—Octave . . . . metal . .	4 feet.
2—Quintaton . . metal . .	16 feet tone.	8—Rohrflote . . metal . .	4 feet tone.
3—Principal . . metal . .	8 feet.	9—Quinte . . . . metal . .	$2\frac{2}{3}$ feet.
4—Salicet . . . . tin . .	8 feet.	10—Super octave . metal .	2 feet.
5—Flaut allemande major . . wood	8 feet tone.	11—Scharf . . . IV ranks	1 foot.
		12—Mixtur . VIII ranks	$1\frac{1}{3}$ foot.
6—Quintaton . . metal . .	8 feet tone.	13—Rauschquint . II ranks	$2\frac{2}{3}$ feet.
		14—Trompete . . metal . .	8 feet.

Echo, 13 Stops.

15—Principal . . of tin, in front	8 feet.	22—Quinte . . . . metal . .	$2\frac{2}{3}$ feet.
16—Gemshorn . . metal . .	8 feet.	23—Super octave . metal .	2 feet.
17—Salicet to tenor f . tin .	8 feet.	24—Waldflote . . . metal .	2 feet.
18—Flaut major . . wood .	8 feet tone.	25—Mixtur . . VI ranks . metal	$1\frac{1}{3}$ foot.
19—Octava . . . . metal . .	4 feet.	26—Cymbel . . III ranks , metal	$1\frac{1}{3}$ foot.
20—Doppel Spitzflote . . wood	4 feet.	27—Vox humana . wood .	8 feet tone.
21—Fugara . . . metal . .	4 feet.		

Choir, 12 Stops.

28—Principal . . of tin, in front	8 feet.	33—Spitzflote . . metal . .	4 feet.
29—Salicet . . to fiddle g . wood	8 feet.	34—Doppelflaut . . wood . .	4 feet tone.
		35—Quint . . . . metal . .	$2\frac{2}{3}$ feet.
30—Flaut allemande . . . metal	8 feet.	36—Super octave . . metal .	2 feet.
		37—Cymbel . . II ranks . .	$1\frac{1}{3}$ foot.
31—Flaut amabile . . wood	8 feet.	38—Mixtur . . IV ranks . .	1 foot.
32—Octave . . . . metal . .	4 feet.	39—Oboe . . . . . metal . .	8 feet.

Pedal, 16 Stops.

40—Principal	32 feet.	48—Flautenbass . . wood .	8 feet.
41—Octave . . . . metal . .	16 feet.	49—Quinte . . . . . metal .	$5\frac{1}{3}$ feet.
42—Violon . . . . wood . .	16 feet.	50—Super octave . metal .	4 feet.
43—Salicet . . . . wood . .	16 feet.	51—Mixtur . . V ranks . . metal	4 feet.
44—Subbass . . . wood . .	16 feet tone.		
45—Octavenbass . wood . .	8 feet.	52—Posaune . . . . wood . .	32 feet.
46—Violoncello . . wood . .	8 feet.	53—Posaune . . . . wood . .	16 feet.
47—Doppelflotenbass . . . wood	8 feet tone.	54—Fagott . . . . metal .	16 feet.
		55—Trompete . . . tin . . .	8 feet.

Accessory Stops, &c.

1—Choir to Great.	6—Wind-valve to Pedal Flue-work.
2—Echo to Great.	7—Wind-valve to Pedal Reed-work.
3—Wind-valve to Great.	8—Glockenspiel to Great.
4—Wind-valve to Choir.	9—Glockenspiel to Pedal.
5—Wind-valve to Echo	

Compass.

Manuals, CC to c^3 in alt, without CC sharp.	Pedal, CCC to tenor d, without CCC sharp.

92. Breslau.

The large Organ in St. Elisabeth's Church, Breslau, was built by Michael Engler, in 1750, and has since been enlarged (1830) by Müller. It has 54 Sounding Stops, 3 Manuals, and Pedal of 14 Stops; and 8 large pairs of Bellows. In the Choir there is a smaller Organ, containing 17 Stops. The details of the chief Organ are as follow:

Great, 16 Stops.

1—Salicet ..... tin.. 16 feet.	10—Quinte ..... $2\frac{2}{3}$ feet.
2—Quintaton .... tin.. 16 feet tone.	11—Super octave... .. 2 feet.
3—Bourdon....wood.. 16 feet tone.	12—Cymbel..III ranks.
4—Principal .... tin.. 8 feet.	13—Mixtur ..VI ranks.
5—Gemshorn.... tin.. 8 feet.	14—Muset-bass ..... 16 feet.
6—Salicet..... tin.. 8 feet.	15—Trompete .. metal.. 8 feet.
7—Flaut major ..wood . 8 feet tone.	16—Vox humana .. tin..
8—Octave ..... tin.. 4 feet.	(labial) ..... 8 feet.
9—Nachthorn..... 4 feet.	

Echo, 14 Stops.

17—Bourdon ....wood.. 16 feet tone.	24—Rohrflote . . wood.. 4 feet tone.
18—Principal.... tin .. 8 feet.	25—Quinte ....metal.. $2\frac{2}{3}$ feet.
19—Salicet ..... tin .. 8 feet.	26—Super octave ..... 2 feet.
20—Fugara..... tin .. 8 feet.	27—Terz ..... $1\frac{3}{5}$ foot.
21—Flaut amabile .wood.. 8 feet.	28—Rauschquinte..... $2\frac{2}{3}$ feet.
22—Octave ..... tin .. 4 feet.	29—Mixtur..IV ranks.
23—Spitzflote ...wood.. 4 feet.	30—Schalmey .. metal.. 8 feet tone.

Choir, 10 Stops.

31—Principal ..... 8 feet.	36—Portunal .....wood. 4 feet.
32—Flaut allemande . tin . 8 feet.	37—Quinte.....metal. $2\frac{2}{3}$ feet.
33—Flaut amabile . wood . 8 feet.	38—Super octave ..... 2 feet.
34—Quintaton ....wood. 8 feet tone.	39—Mixtur—III ranks.
35—Octave..... tin . 4 feet.	40—Oboe ..... metal. 8 feet.

Pedal, 14 Stops.

1—Major bass .. wood . 32 feet tone.	8—Bassflote .... wood . 8 feet tone.
2—Principal .. of tin, in front ..... 16 feet.	9—Gemshornquint .... metal..... $5\frac{1}{3}$ feet.
3—Salicet .. of tin and wood ..... 16 feet.	10—Super octave .. tin.. 4 feet.
4—Violon ..... wood . 16 feet.	11—Mixtur . metal . V ranks.
5—Subbass .. .. wood . 16 feet tone.	12—Posaune .... wood . 32 feet.
6—Quintaton....wood . 16 feet tone.	13—Posaune .... wood . 16 feet.
7—Principal . tin, in front 8 feet.	14—Trompete.... tin .. 8 feet.

Accessory Stops, &c.

1—Choir to Great.	5—Wind-valve to Choir.
2—Echo to Great.	6—Wind-valve to Pedal Flue-work.
3—Wind-valve to Great.	7—Wind-valve to Pedal Reed-work.
4—Wind-valve to Echo.	

Compass.

Manuals, CC to c^3 in alt, without CC sharp.	Pedal, CCC to tenor e, without CCC sharp.

93. Breslau.

Contents of the small Organ in Choir:

Manual, 12 Stops.

1—Principal..in front..	8 feet.	7—Flauta minor	4 feet.
2—Quintaton	8 feet tone.	8—Quinte	$2\frac{2}{3}$ feet.
3—Salicet	8 feet.	9—Super octave	2 feet.
4—Flaut major	8 feet.	10—Cymbel .. II ranks.	
5—Principal	4 feet.	11—Mixture..IV ranks.	
6—Octave	4 feet.	12—Vox Humana.....	8 feet tone.

Pedal, 5 Stops.

1—Violon	16 feet.	4—Doppelflote.....	8 feet.
2—Subbass	16 feet tone.	5—Super octave	4 feet.
3—Octav bass	8 feet.		

Compass.

Manual, CC to c^3 in alt, 4 octaves.	Pedal, CCC to tenor c, 2 octaves.

94. Breslau.

The Organ in the Church of St. Bernhardin was built by Caspirini in 1705, and enlarged by Hartig in 1831. It has 34 Sounding Stops, 2 Manuals, and Pedal of 12 Stops. Besides the large Organ, there is a small one in the Church, which has 14 Stops. The Specifications are as follow:

Large Organ.

Great, 13 Stops.

1—Bordun.....	16 feet tone.	8—Doppelflöte.....	4 feet.
2—Quintaton.....	16 feet tone.	9—Quinta.....	$2\frac{2}{3}$ feet.
3—Principal, in front ..	8 feet.	10—Super-octave.....	2 feet.
4—Gamba.....	8 feet.	11—Mixture..V ranks.	
5—Flaut-major.....	8 feet.	12—Cymbel . II ranks.	
6—Portunal.....	8 feet.	13—Trompete.....	8 feet.
7—Octave.....	4 feet.		

Choir, 10 Stops.

14—Principal, in front ..	8 feet.	19—Quinta.....	$2\frac{2}{3}$ feet.
15—Salicet.....	8 feet.	20—Super-octave.....	2 feet.
16—Flaut amabile.....	8 feet.	21—Mixture..IV ranks.	
17—Octave.....	4 feet.	22—Cymbel...II ranks.	
18—Flaut minor.....	4 feet.	23—Oboe.....	8 feet.

Pedal, 12 Stops.

24—Major.....	32 feet.	30—Doppelflöte	8 feet.
25—Principal, in front ..	16 feet.	31—Quintaton.....	8 feet tone.
26—Violon.....	16 feet.	32—Super-octave.....	4 feet.
27—Sub-bass.....	16 feet tone.	33—Posaune.....	32 feet.
28—Major-Quinta.....10$\frac{2}{3}$	feet.	34—Posaune.....	16 feet.
29—Violin.....	8 feet.	35—Trompete.....	8 feet.

Accessory Stops, &c.

1—Choir to Great.
2—Great to Pedal.
3—Wind-valve to Great.
4—Wind-valve to Choir.
5—Wind-valve to Pedal Flue Stops.
6—Wind-valve to Pedal Reed Stops.

95. Small Organ.

Manual, 10 Stops.

1—Principal	8 feet.	6—Flaut Traverse	4 feet.
2—Gamba	8 feet.	7—Quinte	$2\frac{2}{3}$ feet.
3—Quintatön	8 feet tone.	8—Super-octave	2 feet.
4—Portunal	8 feet.	9—Mixture..IV ranks.	
5—Octave	4 feet.	10—Cymbel..II ranks.	

Pedal, 4 Stops.

11—Violon	16 feet.	13—Octave	8 feet.
12—Sub-bass	16 feet tone.	14—Super-octave	4 feet.

96. Breslau.

The Organ in the Church of St. Vincent at Breslau, has the very unusual proportion of half as many Pedal Stops as there are Manual Stops; that is to say, 15 of the former to 30 of the latter. The Specification is as follows:

Great, 15 Stops.

1—Quintaton	16 feet tone.	9—Gemshorn	4 feet.
2—Principal	8 feet.	10—Octave	2 feet.
3—Gemshorn	8 feet.	11—Rauschquint-bass.	
4—Salcional	8 feet.	12—Mixtur..VI ranks.	
5—Portunal	8 feet.	13—Cymbel.III ranks.	
6—Flaut	8 feet tone.	14—Cornet..IV ranks.	
7—Unda maris	8 feet.	15—Trompete	8 feet.
8—Octave	4 feet.		

Choir, 15 Stops.

16—Prastant	8 feet.	24—Flaut	4 feet.
17—Gamba	8 feet.	25—Flaut travers	4 feet.
18—Fugara	8 feet.	26—Octave-bass	
19—Trinona	8 feet.	27—Quinte..III ranks.	
20—Flaut	8 feet.	28—Mixture.IV ranks.	
21—Quintaton	8 feet tone.	29—Cymbel.III ranks.	
22—Principal	4 feet.	30—Clarinett	8 feet tone.
23—Trinona	4 feet.		

Pedal, 15 Stops.

31—Major	32 feet tone.	39—Violon	8 feet.
32—Principal	16 feet.	40—Violoncello	8 feet.
33—Gamba	16 feet.	41—Flaut	8 feet.
34—Violon	16 feet.	42—Gemshorn quint	$5\frac{1}{3}$ feet.
35—Sub-bass	16 feet tone.	43—Octave	4 feet.
36—Quintaton	16 feet tone.	44—Posaune	16 feet.
37—Octave	8 feet.	45—Trompete	8 feet.
38—Gamba	8 feet.		

Accessory Stops, Couplers, &c.

1—Choir to Great.	3, 4, 5, Three wind trunk valves.
2—Great to Pedal.	Five Bellows.

97. Breslau.

The Organ in the Church of St. Ethelbert, in Breslau, was built by the elder Müller, and completed in 1837. It has 24 Sounding Stops, 2 Manuals, and Pedal of 5 Stops. The following is a list of the Stops:

Great, 12 Stops.

1—Bordun	16 feet tone.	7—Octave	4 feet.
2—Principal..in front..	8 feet.	8—Doppel-rohrflote	4 feet tone.
3—Salicet	8 feet.	9—Quinte	$2\frac{2}{3}$ feet.
4—Gemshorn	8 feet.	10—Super-octave	2 feet.
5—Bordun	8 feet tone.	11—Mixtur..V ranks.	
6—Gemshorn quint	$5\frac{1}{3}$ feet.	12—Clarinet	8 feet tone.

Choir, 7 Stops.

13—Salicet	8 feet.	17—Portunal	4 feet.
14—Flaut major	8 feet.	18—Super-octave	2 feet.
15—Portunal	8 feet.	19—Cymbel..II ranks.	
16—Principal	4 feet.		

Pedal, 5 Stops.

20—Principal	16 feet.	23—Octave	8 feet.
21—Gamba	16 feet.	24—Posaune	16 feet.
22—Sub-bass	16 feet tone.		

Accessory Stops, &c.

1—Choir to Great.	4—Wind-valve to Choir.
2—Great to Pedal.	5—Wind-valve to Pedal.
3—Wind-valve to Great.	

Compass.

Manuals, CC to d^3 in alt.	Pedal, CCC to tenor c.

98.—Breslau.

The Organ in the Church of the Eleven Thousand Virgins, at Breslau, was built by Müller, sen. in 1826; and has 27 Sounding Stops, 2 Manuals, and Pedal. The following is a list of its contents:

Great, 11 Stops.

1—Bordun	16 feet tone.	7—Rohrflote	4 feet tone.
2—Principal	8 feet.	8—Quinta	$2\frac{2}{3}$ feet.
3—Gamba	8 feet.	9—Super-octave	2 feet.
4—Portunal	8 feet.	10—Mixtur..V ranks.	
5—Doppel-flote	8 feet.	11—Clarinett	8 feet tone.
6—Octave	4 feet.		

Choir, 9 Stops.

12—Salicet	8 feet.	17—Nasat quint	$2\frac{2}{3}$ feet.
13—Quintaton	8 feet tone.	18—Super-octave	2 feet.
14—Flaut major	8 feet.	19—Mixtur, III ranks.	
15—Principal	4 feet.	20—Vox Humana, labiel	8 feet.
16—Flaut traverso	4 feet.		

Pedal, 7 Stops.

21—Violon.....	16 feet.	25—Doppel-flote.....	8 feet tone.
22—Gamba.....	16 feet.	26—Octave.....	4 feet.
23—Sub-bass.....	16 feet tone.	27—Posaune.....	16 feet.
24—Octave.....	8 feet.		

Accessory Stops, &c.

1—Choir to Great.
2—Great to Pedal.
3—Wind-valve to Great.
4—Wind-valve to Choir.
5—Wind-valve to Pedal.
Compass of Manuals, CC to f^3 in alt.

99. Breslau.

The Organ in the Church of St. Salvator in Breslau has 19 Stops, of which number 8 are on the Pedal. The following shows the disposition:

Manual, 11 Stops.

1—Principal—in front..	8 feet.	7—Flaut minor.....	4 feet.
2—Salicet.....	8 feet.	8—Quint.....	$2\frac{2}{3}$ feet.
3—Quintaton.....	8 feet tone.	9—Super-octave.....	2 feet.
4—Flaut major.....	8 feet.	10—Mixtur..IV ranks.	
5—Octave.....	4 feet.	11—Cymbel. II ranks.	
6—Gemshorn.....	4 feet.		

Pedal, 8 Stops.

12—Violon.....	16 feet.	16—Quint.....	$5\frac{1}{3}$ feet.
13—Sub-bass.....	16 feet tone.	17—Super-octave.....	4 feet.
14—Octaven-bass.....	8 feet.	18—Mixtur..III ranks.	
15—Floten-bass.....	8 feet tone.	19—Posaune.....	16 feet.

100. Breslau.

The Organ in the Cemetery Church at Breslau has 12 Stops, as follows:

Great, 6 Stops.

1—Principal.....	8 feet.	4—Flaut-major.....	8 feet.
2—Salicet.....	8 feet.	5—Octave.....	4 feet.
3—Quintaton.....	8 feet tone.	6—Spitzflote.....	4 feet.

Choir, 3 Stops.

7—Dulcian (Labial)...	8 feet.	9—Doppel-flote.....	4 feet.
8—Flaut amabile.....	8 feet.		

Pedal, 3 Stops.

10—Sub-bass.....	16 feet tone.	12—Octaven-bass.....	8 feet.
11—Quintaton.....	16 feet tone.		

Couplers, &c.

1—Great to Pedal.
Compass of Manuals, CC to c^3 in alt.
Compass of Pedal, CCC to tenor e.

101. Breslau.

The Organ in the Church of St. Mauritius, in Breslau, has 9 Stops, of which the following is a list:

Manual, 7 Stops.

1—Principal	8 feet.	5—Gemshorn	4 feet.
2—Hohlflote	8 feet.	6—Quinte	$2\frac{2}{3}$ feet.
3—Gedact	8 feet tone.	7—Super octave	2 feet.
4—Octave	4 feet.		

Pedal, 2 Stops.

8—Sub-bass	16 feet tone.	9—Octaven-bass	8 feet.

102. Breslau.

The Organ in the Church of St. Barbara, at Breslau, has 21 Sounding Stops, of which the following is a list:

Great, 8 Stops.

1—Quintaton	16 feet tone.	5—Octave	4 feet.
2—Principal	8 feet.	6—Quint	$2\frac{2}{3}$ feet.
3—Salicet	8 feet.	7—Super octave	2 feet.
4—Flote	8 feet tone.	8—Mixture..V ranks.	

Upper Manual, Choir, 7 Stops.

9—Salicet	8 feet.	13—Quinte	$2\frac{2}{3}$ feet.
10—Flote	8 feet tone.	14—Super octave	2 feet.
11—Principal	4 feet.	15—Mixtur..II ranks.	
12—Doppel-flote	4 feet tone.		

Pedal, 6 Stops.

16—Sub-bass	16 feet tone.	19—Quinten-bass	$5\frac{1}{3}$ feet.
17—Octaven-bass	8 feet.	20—Gemshorn	4 feet.
18—Floten-bass	8 feet tone.	21—Fagott	16 feet.

103. Breslau.

The Organ in the Music-room of the University at Breslau has 14 Stops, distributed in the following manner:

First Manual, 6 Stops.

1—Principal	8 feet.	4—Doppelrohrflote	4 feet tone.
2—Portunal	8 feet.	5—Quint	$2\frac{2}{3}$ feet.
3—Octave	4 feet.	6—Super octave	2 feet.

Upper Manual, 4 Stops.

7—Salcional	8 feet.	9—Rohrflote....metal	4 feet tone.
8—Gedact..metal treble	8 feet tone.	10—Waldflote....metal	2 feet.

Compass, &c.

Manuals, CC to f^3 in alt.	3 Bellows, 8 feet by 4.
Pedals, CCC to tenor e.	

Pedal, 4 Stops.

11—Violon..... 16 feet.	13—Violon..... 8 feet.
12—Sub-bass..... 16 feet tone.	14—Principal..... 4 feet.

104. Cracow.

The Organ in the Evangelists Church at Cracow has 15 Stops, of which the following is a list:

Great, 9 Stops.

1—Bordun....wood.. 16 feet tone.	6—Hohlflote...wood.. 4 feet.
2—Principal.....tin.. 8 feet.	7—Quinte.....tin.. $2\frac{2}{3}$ feet.
3—Gamba.....tin.. 8 feet.	8—Super octave...tin.. 2 feet.
4—Flote.....wood.. 8 feet.	9—Mixtur..III ranks.. 2 feet.
5—Octave.....tin.. 4 feet.	

Choir, 3 Stops.

10—Salicet..... 8 feet.	12—Portunal..... 4 feet.
11—Portunal..... 8 feet.	

Pedal, 3 Stops.

13—Violon..... 16 feet.	15—Violon..... 8 feet.
14—Sub-bass..... 16 feet tone.	

105. Warsaw.

The Organ in the Lutheran Church at Warsaw has 27 Sounding Stops. It was built in 1827-9, by Robert Müller, jun. of Breslau; and has 6 Bellows, 10 feet long by 5 in breadth. The following is an enumeration of the Stops:

Great, 10 Stops.

1—Principal, tin, in front 16 feet.	6—Octave.....tin 4 feet.
2—Principal..tin..... 8 feet.	7—Doppel-rohrflote,wood 4 feet tone.
3—Gemshorn.tin..... 8 feet.	8—Quint.....tin $2\frac{2}{3}$ feet.
4—Portunal..wood.... 8 feet.	9—Octave.....tin 2 feet.
5—Doppel-flote, wood.. 8 feet tone.	10—Mixtur, tin..VI ranks.

Choir, 8 Stops.

11—Salicet.....tin 8 feet.	15—Principal.....tin 4 feet.
12—Flauto.....wood 8 feet.	16—Salicet.....tin 4 feet
13—Flaut traverse..wood 8 feet.	17—Violini.....tin 2 feet.
14—Quintaton.....tin 8 feet tone.	18—Clarinett..... 8 feet tone.

Pedal, 9 Stops.

19—Major.....wood 32 feet tone	24—Quint.....wood $5\frac{1}{3}$ feet.
20—Violon.....wood 16 feet.	25—Octave.....tin 4 feet.
21—Gamba.....wood 16 feet.	26—Posaune.....wood 16 feet.
22—Sub-bass.....wood 16 feet tone.	27—Trompete.....wood 8 feet.
23—Octaven-bass...wood 8 feet.	

106. Vienna.

The Organ in the Cathedral Church of St. Stephen at Vienna is a very old one. It has 41 Stops, distributed among 2 Manuals and Pedal in the following manner:

Great, 18 Stops.

1—Major Flute	16 feet.	10—Fugara	4 feet.
2—Quintadon	16 feet tone.	11—Nachthorn	4 feet.
3—Principal	8 feet.	12—Quint	$2\frac{2}{3}$ feet.
4—Bourdun	8 feet tone.	13—Super octave	2 feet.
5—Gamba	8 feet.	14—Mixtur	VIII ranks.
6—Salicional	8 feet.	15—Sesquialtera	IV ranks.
7—Octave	4 feet.	16—Cimbel	VIII ranks.
8—Spitzflute	4 feet.	17—Scharf	IV ranks.
9—Gamba	4 feet.	18—Trompete	8 feet.

Choir, 10 Stops.

19—Coppel	8 feet.	24—Flote	4 feet.
20—Rohrflote	8 feet tone.	25—Dulciana	4 feet.
21—Flote Amabile	8 feet.	26—Nazard	$2\frac{2}{3}$ feet.
22—Quintaton	8 feet tone.	27—Octave	2 feet.
23—Principal	4 feet.	28—Mixtur	V ranks.

Pedal, 13 Stops.

29—Principal	metal 16 feet.	36—Octave	4 feet.
30—Sub-bass	wood 16 feet.	37—Mixtur	VI ranks.
31—Bourdon	16 feet tone.	38—Cornet	IV ranks.
32—Principal	metal 8 feet.	39—Bombarde	16 feet.
33—Octave	wood 8 feet.	40—Posaune	16 feet.
34—Violoncello	8 feet.	41—Trompete	8 feet.
35—Quinte	$5\frac{1}{3}$ feet.		

Accessory Stops, &c.	Compass.
1—Choir to Great.	Manuals, CC to d^3 in alt.
2—Great to Pedal.	Pedal, CCC to tenor c.
3—Tremulant.	
4, 5, 6, Three Wind-trunk Valves.	

107. Vienna.

The Organ in St. Michael's Church at Vienna is a very old Instrument. It has 3 Manuals, Pedal, and 40 Stops, the distribution and name of which are as follow:

Great, 16 Stops.

1—Bourdon	16 feet tone.	9—Nachthorn	4 feet.
2—Principal	8 feet.	10—Feldflote	4 feet.
3—Piffaro	8 feet.	11—Quint	$2\frac{2}{3}$ feet.
4—Quintadon	8 feet tone.	12—Tierce	$1\frac{3}{5}$ foot.
5—Salicional	8 feet.	13—Mixtur	II ranks.
6—Octave	4 feet.	14—Sesquialtera	III ranks.
7—Fugara	4 feet.	15—Cymbel	V ranks.
8—Spitzflote	4 feet.	16—Super octave	1 foot.

Choir, 10 Stops.

17—Coppel.....	8 feet.	22—Flaut minor.....	4 feet.
18—Flote major.....	8 feet.	23—Quinte.....	$2\frac{2}{3}$ feet.
19—Principal.....	4 feet.	24—Octave.....	2 feet.
20—Octave.....	4 feet.	25—Super octave.....	1 foot.
21—Coppel.....	4 feet.	26—Mixtur..II ranks.	

Echo, 4 Stops.

27—Copel.....	8 feet.	29—Flote.....	4 feet.
28—Principal.....	4 feet	30—Octave.....	2 feet.

Pedal, 10 Stops.

31—Principal.....metal	16 feet.	36—Coppel.....	8 feet.
32—Sub-bass.....wood	16 feet.	37—Octave.....	4 feet.
33—Bourdon.....wood	16 feet tone.	38—Cornet..III ranks.	
34—Octave.....metal	8 feet.	39—Posaune.....	16 feet.
35—Octave.....wood	8 feet.	40—Trompete.....	8 feet.

Accessory Stops.	Compass.
1—Choir to Great.	Manuals CC to c^3 in alt, short octaves.
2—Echo to Great.	Pedal, CCC, short, to A.

108. Vienna.

The Organ in the Lutheran Church at Vienna was built by Deutschmann, of that city; and has 2 Manuals and Pedal, and 23 Stops, of which the following is a list:

Great, 9 Stops.

1—Principal.....	8 feet.	6—Quint.....	$2\frac{2}{3}$ feet.
2—Gamba.....	8 feet.	7—Super octave.....	2 feet.
3—Flote.....	8 feet.	8—Mixtur..IV ranks.	
4—Octave.....	4 feet.	9 Hautbois discant.. / Fagotto bass.....	8 feet.
5—Fugara.....	4 feet.		

Choir, 6 Stops.

10—Coppel.....	8 feet.	13—Octave.....	2 feet.
11—Principal.....	4 feet.	14—Super octave.....	1 foot.
12—Dulciana.....	4 feet.	15—Vox Humana.....	8 feet tone.

Pedal, 8 Stops.

16—Bordon..open.....	16 feet.	20—Octave.....	8 feet.
17—Sub-bass.....	16 feet tone.	21—Octave.....	4 feet.
18—Principal.....	8 feet.	22—Posaune.....	16 feet.
19—Violoncello.....	8 feet.	23—Trompete.....	8 feet.

Accessory Stops, &c.	Compass.
1—Choir to Great.	Manuals, CC to d^3 in alt.
2—Tremulant Choir.	Pedal, CCC to A.

109. Vienna.

The Organ in the Church of the Minorites at Vienna, which is a very old one, has lately been renovated by Deutschmann, of that city. It has 2 Manuals and Pedal, and 24 Stops, of which the following is a list:

Great, 10 Stops.

1—Principal	8 feet.	6—Nachthorn	4 feet.
2—Quintadon	8 feet tone.	7—Quint	$2\frac{2}{3}$ feet.
3—Waldflote	8 feet.	8—Super octave	2 feet.
4—Octave	4 feet.	9—Mixtur	V ranks.
5—Rohrflote	4 feet tone.	10—Cimbel	II ranks.

Choir, 8 Stops.

11—Principal	8 feet.	15—Flote	4 feet.
12—Coppel	8 feet.	16—Octave	2 feet.
13—Salicional	8 feet.	17—Quint	$1\frac{1}{3}$ foot.
14—Principal	4 feet.	18—Super octave	1 foot.

Pedal, 6 Stops.

19—Coppel	16 feet.	22—Octave	8 feet.
20—Violone	16 feet.	23—Quint,	$5\frac{1}{3}$ feet.
21—Principal	8 feet.	24—Cornet	III ranks.

Accessory Stops.	Compass.
1—Choir to Great.	Manuals, CC short to f^3 in alt.
2—Great to Pedal.	Pedal, CCC short to A.

110. Vienna.

The Organ in St. Peter's Church is a very old instrument. It has 30 Stops, 3 Manuals, and Pedal of 6 Stops. There are no Reeds in the Organ, and the Mixtures are harsh; but the 16, 8, and 4 feet Stops are good. The following is a Specification of the Stops:

Great, 12 Stops.

1—Principal	8 feet.	7—Gemshorn	4 feet.
2—Coppel	8 feet.	8—Nachthorn	4 feet.
3—Gamba	8 feet.	9—Fugara	4 feet.
4—Salicional	8 feet.	10—Quint	$2\frac{2}{3}$ feet.
5—Quintadon	8 feet tone.	11—Octave	2 feet.
6—Octave	4 feet.	12—Mixtur	VI ranks.

Echo, 8 Stops.

13—Coppel	8 feet.	17—Flagiolet	2 feet.
14—Principal	4 feet.	18—Quint	$1\frac{1}{3}$ foot.
15—Flote	4 feet.	19—Octave	1 foot.
16—Octave	2 feet.	20—Mixtur	IV ranks.

Choir, 4 Stops.

21—Coppel	8 feet.	23—Flote	4 feet.
22—Principal	4 feet.	24—Octave	2 feet.

Pedal, 6 Stops.

25—Coppel	16 feet.	28—Octave	8 feet.
26—Sub-bass	16 feet tone.	29—Octave	4 feet.
27—Principal	8 feet.	30—Cornet..IV ranks.	

Compass.

Compass of Manuals CC short, to c^3 in alt. | Compass of Pedal, CCC short to A.

111. Freiburg in Switzerland.

In the Cathedral Church of St. Nicholas, at Freiburg, in Switzerland, is a particularly fine Organ, built by Aloise Moser in 1834. It has 4 Manuals, 2 Pedals, 61 Stops, and 4165 Pipes. The Draw Stops do not operate in the usual way, forwards, but they slide to the right and left. The Case is of dark walnut-tree wood, very elaborately ornamented with carved work, gilded. The Voix Humaine in the Echo is described as being a singularly successful Stop. The following is a list of the contents of this admirable Instrument:

Great, 16 Stops.

1—Montre	16 feet.	10—Fourniture..VI and VII ranks	2 feet.
2—Bourdon	16 feet tone.	11—Cymbale..III ranks	2 feet.
3—Octave	8 feet.	12—Scharf..VIII ranks	2 feet.
4—Principal	8 feet.	13—Petit Cornet III ranks.	
5—Bourdon	8 feet tone.	14—Grand Cornet, a Reed	16 feet.
6—Gamba	8 feet.	15—Trombone	8 feet.
7—Prestant	4 feet.	16—Clairon	4 feet.
8—Dulciana	4 feet.		
9—Doublette	2 feet.		

Choir, 14 Stops.

17—Quintadena	16 feet tone.	25—Nazard	$2\frac{2}{3}$ feet.
18—Principal	8 feet.	26—Doublette	2 feet.
19—Principal	8 feet.	27—Flageolet	1 foot.
20—Gamba	8 feet.	28—Fourniture..IV and V ranks	2 feet.
21—Flute douce	8 feet.	29—Cornet....V ranks	8 feet.
22—Octave	4 feet.	30—Trompete	8 feet.
23—Flute	4 feet.		
24—Flute a chiminee	4 feet tone.		

Positif, 12 Stops.

31—Montre	8 feet.	37—Flute bouchee	4 feet.
32—Bourdon	8 feet tone.	38—Dulciana	4 feet.
33—Viola	8 feet.	39—Quint Flute	$2\frac{2}{3}$ feet.
34—Salicional	8 feet.	40—Flageolet	2 feet.
35—Prestant	4 feet.	41—Cornet..V ranks.	
36—Calcan	4 feet.	42—Cromorne	8 feet tone.

Great Pedal, 6 Stops.

43—Bass-Bourdon	32 feet tone.	46—Prestant	4 feet.
44—Sons-bass	16 feet.	47—Bombarde	16 feet.
45—Octave	8 feet.	48—Trombone	8 feet.

Choir Pedal, 5 Stops.

49—Montre.....	16 feet.	52—Prestant	4 feet.
50—Principal.....	8 feet.	53—Trompete..	8 feet.
51—Flute.....	8 feet.		

Accessory Stops, &c.

1—Choir to Great.	3—Tremulant Great.
2—Great to Pedal.	4—Tremulant Echo.

Compass.

Manuals, CC to f^3 in alt.	Pedals, CCC to tenor c.

This Organ had neither Composition Pedals nor Swell in 1851; but both were going to be added, and also a Seraphine appendage.

112. Gersau.

The Organ in the Cathedral Church at Gersau, in Switzerland, was made by Moser, the builder of the famous instrument at Freibourg; and though but a small one in comparison with many in Germany, yet it shows that, even in instruments of inferior size, the foreign builders still preserve inviolate the same magnificent features which characterize their larger ones; namely, a full and powerful Pedale; a good foundation of Unisons and Doubles upon the Manuals; and a brilliant superstructure of Mixtures and Chorus Stops amply sufficient to correspond thereto. The full Organ is therefore, as may be supposed, exceedingly fine. This Organ has 30 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Principal.....	16 feet.	8—Quint.....	$2\frac{2}{3}$ feet.
2—Principal.....	8 feet.	9—Octave.....	2 feet.
3—Copel.....	8 feet.	10—Mixtur..IV ranks..	$1\frac{1}{3}$ foot.
4—Gamba-douce.....	8 feet.	11—Cornet..III ranks.	
5—Octave.....	4 feet.	12—Fagot.....	16 feet.
6—Dulciana..	4 feet.	13—Trompete....	8 feet.
7—Wald-flote.....	4 feet.	14—Fagot.....	4 feet.

Choir, 8 Stops.

15—Gamba.....	8 feet.	19—Quint.....	$2\frac{2}{3}$ feet.
16—Rohrflote.....	8 feet tone.	20—Octave	2 feet.
17—Copel.....	8 feet.	21—Flageolet	2 feet.
18—Flaut	4 feet.	22—Mixtur..III ranks.	

Pedal, 8 Stops.

23—Sub-bass..	32 feet tone.	27—Octave.....	4 feet.
24—Octave-bass...	16 feet.	28—Mixtur..IV ranks..	$2\frac{2}{3}$ feet.
25—Principal.....	8 feet.	29—Bombarde.....	16 feet.
26—Quint..	$5\frac{1}{3}$ feet.	30—Trompete.....	8 feet.

Coupler, Choir to Great.

Compass.

Manuals, CC to f^3 in alt.	Pedal, CCC to tenor c.

113. Soleure.

The Organ in the Cathedral at Soleure, in Switzerland, was made by Bossart de Zug in 1790, and is remarkable for being without "Double" Stops on the Manuals. It has 3 Manuals and Pedal, and 39 Sounding Stops, of which the following is a list:

Great, 16 Stops.

1—Principal	8 feet.	9—Super octave	2 feet.
2—Bourdun	8 feet tone.	10—Tertia	$1\frac{3}{5}$ foot.
3—Gamba	8 feet.	11—Larigot	$1\frac{1}{3}$ foot.
4—Copel	8 feet.	12—Flageolet	1 foot.
5—Flauta	8 feet.	13—Sesquialtera.	
6—Octava	4 feet.	14—Mixture.	
7—Flauttons	4 feet.	15—Fourniture.	
8—Quinta	$2\frac{2}{3}$ feet.	16—Tromba	8 feet.

Choir, 8 Stops.

17—Principal	8 feet.	21—Super octava	2 feet.
18—Copel	8 feet.	22—Mixtur.	
19—Octava	4 feet.	23—Cornet.	
20—Quinta	$2\frac{2}{3}$ feet.	24—Vox Humana	8 feet tone.

Echo, 7 Stops.

25—Principal	8 feet.	29—Mixtur.	
26—Copel	8 feet.	30—Cornet.	
27—Flaut	4 feet.	31—Fagott	8 feet.
28—Nassat	$2\frac{2}{3}$ feet.		

Pedal, 8 Stops.

32—Sub-bass	16 feet.	36—Octava	4 feet.
33—Bordon	16 feet tone.	37—Mixtur	III ranks.
34—Principal	8 feet.	38—Bombarde	16 feet.
35—Quinta	$5\frac{1}{3}$ feet.	39—Tromba	8 feet.

Accessory Stops, &c.	Compass.
1—Coupler Choir to Great.	Manuals, CC to d^3 in alt.
2—Tremulant to Choir.	Pedal, CCC to gamut A.

114. Lucerne.

The Organ in the Cathedral at Lucerne, in Switzerland, was built by Geissler of Salzbourg, in the year 1651. It has 48 Stops, 3 Manuals, and Pedal of 13 Stops, among which is a particularly fine Sub-bass of 32 feet in metal. It is proposed to rebuild this Organ very shortly.

Over the Manuals is the following quaint account of the Organ:

"Organ in the Collegiate Church at Lucerne."

"This Organ is the master-piece of John Geissler, native of Salzbourg. It was commenced and finished in the space of 17 years. The first use made of it dates

from 1651, when the son of this famous artist, elected Chaplain of this College, was celebrating his first Mass. The whole work consists of 3 Manuals; of a Pedal with 2 octaves; and 2826 Pipes, composed, for the most part of them, of English pewter. The largest of these measures 2 feet in diameter (qy.), 37 feet in length, and should contain very easily 1308 French pints of any liquor. The Mixtures of this admirable work may be varied 7 times, and besides this advantage, there are several registers whereby one may make use of the three Manuals together, or one or two of them separately. This masterpiece was first tried and approved of by 4 Organists belonging to foreign princes, and cost about 12,000 Rhenish Florins, a sum which is esteemed very valuable for that time."

The following is a list of the Stops in the Lucerne Organ:

Great, 12 Stops.

1—Nachthorn	16 feet.	7—Nazard	$2\frac{2}{3}$ feet tone.
2—Prestant	8 feet.	8—Spitzflote	2 feet.
3—Hohlflote	8 feet.	9—Quintadena	2 feet tone.
4—Salicional	8 feet.	10—Sesquialtera. V ranks	$2\frac{2}{3}$ feet.
5—Gemshorn	4 feet.	11—Trompet	8 feet.
6—Quint-flote	$2\frac{2}{3}$ feet tone.	12—Vox Humana	8 feet.

Choir, 11 Stops.

1—Principal	8 feet.	7—Mixtur..III ranks.	
2—Hohlflote	8 feet.	8—Cimbel..III ranks.	
3—Quint	$5\frac{1}{3}$ feet.	9—Cornet.. V ranks.	
4—Octave	4 feet.	10—Schalmei	8 feet tone.
5—Quint-flote	$2\frac{2}{3}$ feet tone.	11—Hornlein, a small reed	8 feet.
6—Terz-flote	$1\frac{3}{5}$ feet tone.		

Echo, 12 Stops.

1—Principal	16 feet.	7—Gross-terz	$3\frac{1}{5}$ feet.
2—Octave	8 feet.	8—Duodecima	$2\frac{2}{3}$ feet.
3—Solo Principal	8 feet.	9—Quintadena	2 feet tone.
4—Viola	8 feet.	10—Klein-Terz	$1\frac{3}{5}$ foot.
5—Quint	$5\frac{1}{3}$ feet.	11—Sesquialtera, IV ranks	$2\frac{2}{3}$ feet.
6—Super-octave	4 feet.	12—Mixtur ..III ranks.	

Pedal, 13 Stops.

1—Sub-bass..metal	32 feet.	8—Super octave	4 feet.
2—Bass .....metal	16 feet.	9—Mixtur..V ranks.	
3—Principal..metal	16 feet.	10—Bombarde	16 feet.
4—Holz-bass. wood	16 feet.	11—Posaune	8 feet.
5—Bourdon .. wood	16 feet tone.	12—Portune	4 feet.
6—Octave	8 feet.	13—Horn	2 feet.
7—Klein-octave	8 feet.		

Accessory Stops, &c.

1—Echo to Great.	3—Great to Pedal.
2—Choir to Great.	4—Echo to Choir.

Compass.

Manuals, CC to e^3 in alt. short octaves. | Pedal, CCC to tenor c, short octaves.

114 a. Winterthur.

The Organ in the principal Church at Winterthur, near Zurich, was built partly by Hasse and partly by Moser, of Freiburg. It contains 44 Sounding Stops, 3 Manuals, and a Pedal of 9 Stops. Among the latter is a very fine 32-feet Sub-Bass, of wood. The following is a list of the Stops in the above-mentioned Organ:

Great, 14 Stops.

1—Principal	16 feet.	8—Octav	4 feet.
2—Bourdon	16 feet tone.	9—Fugara	4 feet.
3—Octav	8 feet.	10—Quinte	$2\frac{2}{3}$ feet.
4—Bourdon	8 feet tone.	11—Wald Flote	2 feet.
5—Viol de Gamba	8 feet.	12—Mixture	V ranks.
6—Flote, dopp. lab.	8 feet.	13—Cornet	V ranks.
7—Quint Flote	$5\frac{1}{3}$ feet tone.	14—Trompete	8 feet.

Choir, 11 Stops.

15—Bourdon	16 feet tone.	21—Rohrflote	4 feet tone.
16—Principal	8 feet.	22—Flauto Traverso	4 feet.
17—Viol de Gamba	8 feet.	23—Octave	2 feet.
18—Bourdon	8 feet tone.	24—Mixture	IV ranks.
19—Dolce	8 feet.	25 Clarinet Treble / Bassoon Bass	8 feet.
20—Gemshorn	4 feet.		

Swell, 10 Stops.

26—Principal	8 feet.	32—Flauto d'amore	4 feet.
27—Lieblich Gedact	8 feet tone.	33—Flautino	2 feet.
28—Harmonica	8 feet.	34—Physarmonica, free reeds	8 feet.
29—Salicional	8 feet.	35—Vox Humana	8 feet tone.
30—Lieblich Flote	8 feet tone.		
31—Spitz Flote	4 feet.		

Pedal, 9 Stops.

36—Sub-Bass, wood	32 feet.	41—Violoncello	8 feet.
37—Octav Bass, wood	16 feet.	42—Octav	4 feet.
38—Sub-Bass, wood	16 feet tone.	43—Posaune	16 feet.
39—Octav Bass, metal	8 feet.	44—Trompete	8 feet.
40—Flote Bass, wood	8 feet tone.		

Accessory Stops, Movements, &c.

1—Coupler, Choir to Great.	5, 6, 7—Three Wind-trunk Valves.
2—Ditto .. Swell to Choir.	8—Tremulant to Swell.
3—Ditto .. Great to Pedal.	9, 10—Two Composition Pedals.
4—Ditto .. Choir to Pedal.	

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to tenor c, 25 notes.

115. Constance.

The Organ in the Cathedral of Constance, in Switzerland, was originally built in the year 1518, which date appears on the Case of the Instrument. It stands at the west end of the nave, and has the front Pipes richly decorated with diaper and scroll-

work. The Organ has 2 Manuals and Pedal, and 27 Sounding-stops, of which the following is a list:

Great, 11 Stops.

1—Bourdon	16 feet tone.	7—Quinte	$2\frac{2}{3}$ feet.
2—Principal	8 feet.	8—Super-octave	2 feet.
3—Viola di Gamba	8 feet.	9—Mixtur..VI ranks..	2 feet.
4—Gedact	8 feet tone.	10—Cymbal..IV ranks..	1 foot.
5—Octave	4 feet.	11—Dulcian	8 feet.
6—Flote Gedact	4 feet tone.		

Choir, 8 Stops.

12—Principal	8 feet.	16—Octave	4 feet.
13—Gemshorn	8 feet.	17—Rohrflote	4 feet tone.
14—Bourdon	8 feet tone.	18—Quinte	$2\frac{2}{3}$ feet.
15—Salicional	8 feet.	19—Mixtur..III ranks	2 feet.

Pedal, 8 Stops.

20—Principal-bass	16 feet.	24—Rausch-quint.II ranks.	$2\frac{2}{3}$ feet.
21—Nassat-major	12 feet tone.	25—Mixtur.....IV ranks.	2 feet.
22—Octave-bass	8 feet.	26—Posaune	16 feet.
23—Prestant-bass	4 feet.	27—Trompet	8 feet.

Accessory Stops.	Compass.
1—Choir to Great.	Manuals, CC to f^3 in alt.
2—Great to Pedal.	Pedal, CCC to Gamut G.

115 a. Stutgard.

The Organ in the Stiftskirche, at Stutgard, was built in the year 1737, by Martin, of Hayengen, partner of the celebrated Organ-builder, Gabler, for the Benedictine Abbey of Zwiefalten. It has been repaired and enlarged by Walker, of Ludwigsburg, and is a particularly fine instrument. It has 4 Manuals and 2 Pedals, and contains 68 Sounding-stops, of which the following is a list:

Great Organ, 16 Stops.

1—Bourdon	32 feet tone.	9—Octav	4 feet.
2—Principal	16 feet.	10—Dolce	4 feet.
3—Bourdon	16 feet tone.	11—Fugara	4 feet.
4—Octav	8 feet.	12—Octav	2 feet.
5—Gamba	8 feet.	13—Mixtur..IV ranks.	
6—Viola	8 feet.	14—Cornet..V ranks.	
7—Piffara..II ranks..8 & 4 feet.		15—Tuba	16 feet.
8—Quint	$5\frac{1}{3}$ feet.	16—Trompete	8 feet.

Second Manual, 13 Stops.

17—Bourdon	16 feet tone.	24—Flote	4 feet.
18—Principal	8 feet.	25—Rohrflote	4 feet tone.
19—Gedackt	8 feet tone.	26—Nazard	$2\frac{2}{3}$ feet.
20—Viola	8 feet.	27—Octav	2 feet.
21—Salicional	8 feet.	28—Mixtur..II ranks.	
22—Piffara	8 feet.	29—Clarinet	8 feet tone.
23—Octav	4 feet.		

Choir, or 3rd Organ, 11 Stops.

30—Salicional	16 feet.	36—Octav	4 feet.
31—Principal	8 feet.	37—Travers Flote	4 feet.
32—Gedackt	8 feet tone.	38—Flageolet	2 feet.
33—Viola	8 feet.	39—Mixtur..II ranks.	
34—Harmonica	8 feet.	40—Physharmonica	8 feet.
35—Flote	8 feet.		

Echo Organ, 8 Stops.

41—Principal	8 feet.	45—Octav	4 feet.
42—Gedackt	8 feet tone.	46—Flote	4 feet.
43—Viola	8 feet.	47—Salicional	4 feet
44—Dolce	8 feet.	48—Super-octav	2 feet.

First Pedal, 14 Stops.

49—Sub-bass...wood	32 feet.	56—Quint	$5\frac{1}{3}$ feet.
50—Principal...metal	16 feet.	57—Octav	4 feet.
51—Octav.....wood	16 feet.	58—Posaune	32 feet.
52—Violone..II ranks	16 & 8 feet.	59—Posaune	16 feet.
53—Quint	$10\frac{2}{3}$ feet.	60—Trompete	8 feet.
54—Octav	8 feet.	61—Clarion	4 feet.
55—Quintadon	8 feet tone.	62—Clarion	2 feet.

Second Pedal, 7 Stops.

63—Bourdon	16 feet tone.	67—Flautino	2 feet.
64—Violoncello	8 feet.	68—Serpent	16 feet.
65—Bourdon	8 feet tone.	69—Basset Horn	8 feet.
66—Flote	4 feet.		

Accessory Stops.

1—First Pedal to Second Pedal.	4—Second Manual to Second Pedal.
2—First and Second Manual.	5—Second and Third Manual.
3—First Manual to First Pedal.	6—Third and Fourth Manual.

Compass.

Four Manuals, CC to d^3 in alt.	Two Pedals, CCC to Tenor d.

116. Weingarten.

The Benedictine Monastery at Weingarten, in Upper Suabia, possesses an Organ of great magnitude and power. It was built by Gabelaar, of Ravensbourg, and was finished on the 24th of June, 1750. It has 4 Manuals and 2 Pedals; 64 Stops, among which are 2 of 32 feet, and 8 of 16 feet; 6666 Pipes; and an unprecedented number of ranks in the Mixture-work. It is said that Gabelaar's Organ gave so much satisfaction, that the monks, who were very rich, presented him with 6666 florins above his charge, being an additional florin for each Pipe.

There are accounts of this fine Organ in Dom Bedos' *Facteur d'Orgues*, accompanied by an elaborate engraving of it; in Knecht's *Orgelschule*, and in Martini's *School for the Organ*, all of which differ from one another; and as it is uncertain

which account, if either, correctly describes the Organ in its present state, the original list of Stops is here subjoined, as being in such case the most interesting:

Great, 12 Stops.

1—Principal	16 feet.	7—Hohlflote	2 feet.
2—Octave	8 feet.	8—Sesquialtera. VIII rks.	2⅔ feet.
3—Rohrflote	8 feet tone.	9—Fourniture . . XX rks.	2 feet.
4—Piffaro	8 feet.	10—Cymbale. . . VIII rks.	1 foot.
5—Octave	4 feet.	11—Trompete	8 feet.
6—Doublette	2 feet.	12—Carillon.	

Choir, 12 Stops.

13—Bourdon	16 feet tone.	19—Unda-maris	8 feet tone.
14—Montre	8 feet.	20—Prestant	4 feet.
15—Salicional	8 feet.	21—Viola	4 feet.
16—Violoncello	8 feet.	22—Nasard	2 feet.
17—Bourdon	8 feet tone.	23—Fourniture . XXI rks.	2⅔ feet.
18—Flute creuse	8 feet.	24—Cymbale . . . . II rks.	2 feet.

Positif, 12 Stops.

25—Principal, in front	8 feet.	31—Flute a chiminee	4 feet tone.
26—Violoncello	8 feet.	32—Quer Flute	4 feet.
27—Quintaton	8 feet tone.	33—Flageolet	2 feet.
28—Flute douce	8 feet.	34—Cornet . . XII ranks .	2 feet.
29—Piffaro	4 feet.	35—Hautbois	8 feet.
30—Flute Traversiere	4 feet.	36—Voix Humaine	8 feet tone.

Echo, 12 Stops.

37—Bourdon	16 feet tone.	43—Piffaro	4 feet.
38—Montre	8 feet.	44—Hohl-flute	4 feet.
39—Violoncello	8 feet.	45—Superoctave	2 feet.
40—Quintaton	8 feet tone.	46—Fourniture . XII rks.	2 feet.
41—Flute	8 feet.	47—Cornet . . . . IV rks.	1 foot.
42—Octave	4 feet.	48—Hautbois	8 feet.

First Pedal, 9 Stops.

49—Contre bass, in front .	32 feet.	55—Scharf	4 feet.
50—Sous bass	32 feet tone.	56—Carillon en cloches . .	4 feet.
51—Octave bass	16 feet.	57—Bombarde	16 feet.
52—Violon bass	16 feet.	Timpano.	
53—Bombarde bass	16 feet.	Concon.	
54—Fourniture . V ranks .	8 feet.	Cymbales.	

Second Pedal, 9 Stops.

58—Quintaton	16 feet tone.	64—Sesquialtera . . II and III ranks	2⅔ feet.
59—Superoctave, in front .	8 feet.	65—Trompet	8 feet.
60—Violoncello	8 feet.	66—Fagot	8 feet.
61—Flute douce	8 feet.	Rossignol.	
62—Flute creuse	4 feet.	Tremblant.	
63—Cornet . . V ranks . .	4 feet.		

117. Munich.

The Organ in the Odeon Concert-Room at Munich is a little gem. It was built in 1851, by Walker, of Ludwigsburg, and contains 20 Stops, distributed among 2

Manuals and Pedal. The Phys-armonica is on a separate wind, and is managed by a new pedal contrivance so as to produce the most exquisite effects of delicate crescendo and diminuendo. The following is the Specification of the above-named Organ:

Great, 10 Stops.

1—Bourdon....wood..	16 feet tone.	6—Octave.....metal .	4 feet.
2—Principal.. .metal .	8 feet.	7—Flote .....wood..	4 feet.
3—Gamba .....wood..	8 feet.	8—Octave .....metal .	2 feet.
4—Rohrflote....metal .	8 feet tone.	9—Cornet..VII ranks .	16 feet tone.
5—Gedact .....wood..	8 feet tone.	10—Trompete	8 feet.

Echo, 6 Stops.

11—Salicional...metal..	8 feet.	14—Spitzflote...metal..	4 feet.
12—Flote .....wood ..	8 feet.	15—Dolce.....metal..	4 feet.
13—Gedact ....wood ..	8 feet tone.	16—Phys-armonica	8 feet.

Pedal, 4 Stops.

17—Subbass.wood, open .	16 feet.	19—Violoncello... metal.	8 feet.
18—Viol de Gamba.metal.	16 feet.	20—Fagotto.....	16 feet.

Accessory Stops.	Compass.
1—Echo to Great.	Manuals, CC to f^3 in alt.
2—Great to Pedal.	Pedal, CCC to tenor d.

118. Ratisbon.

The Organ in the Church of St. Emmeran, at Ratisbon, was built about 250 years ago. It has 28 Stops, distributed among 2 Manuals and Pedal in the following manner:

Great, 10 Stops.

1—Principal.....	8 feet.	6—Flote	4 feet.
2—Bourdon.....	8 feet tone.	7—Quint.....	$2\frac{2}{3}$ feet.
3—Gamba	8 feet.	8—Super-octave	2 feet.
4—Copel.....	8 feet.	9—Mixtur, major . III ranks.	
5—Octave	4 feet.	10—Mixtur, minor..II ranks.	

Choir, 8 Stops.

11—Copel.....	8 feet.	15—Octave	4 feet.
12—Salicional	8 feet.	16—Flote	4 feet.
13—Allemande	8 feet.	17—Spitzflote	4 feet.
14—Principal	4 feet.	18—Super-octave.....	2 feet.

Pedal, 8 Stops.

19—Grossbass	16 feet.	23—Quint.....	$5\frac{1}{3}$ feet.
20—Violone	16 feet.	24—Octave	4 feet.
21—Principal	8 feet.	25—Super-octave.....	2 feet.
22—Violoncello	8 feet.	26—Mixtur..V ranks.	

Accessory Stops.	Compass.
1—Choir to Great.	Manuals, CC to c^3 in alt.
2—Great to Pedal.	Pedal, CCC to A.

119. Botzen.

The Organ in the Parish Church at Botzen, Tyrol, was built by Hess, and repaired by Carlo Mauracher. It has 2 Manuals and Pedal, and 30 Stops, of which the following is a list:

Great, 12 Stops.

1—Coppel	16 feet.	7—Flauto duodecimo	$2\frac{2}{3}$ feet.
2—Gamba	8 feet.	8—Super-octave	2 feet.
3—Flaut amabile	8 feet.	9—Mixtur.	
4—Flauto stoppo	8 feet tone.	10—Cornet.	
5—Quintadena	8 feet tone.	11—Trombe	8 feet.
6—Octave	4 feet.	12—Vox Humana	8 feet tone.

Choir, 10 Stops.

13—Copel	8 feet.	18—Sesquialtera . II rks.	$2\frac{2}{3}$ feet.
14—Viola	8 feet.	19—Flageolet	2 feet.
15—Salicional	8 feet.	20—Tibea Silvest	2 feet.
16—Principal	4 feet.	21—Cymbal	$1\frac{3}{5}$ foot.
17—Flauto	4 feet.	22—Dulcian	8 feet.

Pedal, 8 Stops.

23—Principal-bass	16 feet.	27—Octave-bass	8 feet.
24—Violon-bass	16 feet.	28—Mixtur-bass	4 feet.
25—Sub-bass	16 feet tone.	29—Posaune	8 feet.
26—Principal	8 feet.	30—Clairon	4 feet.

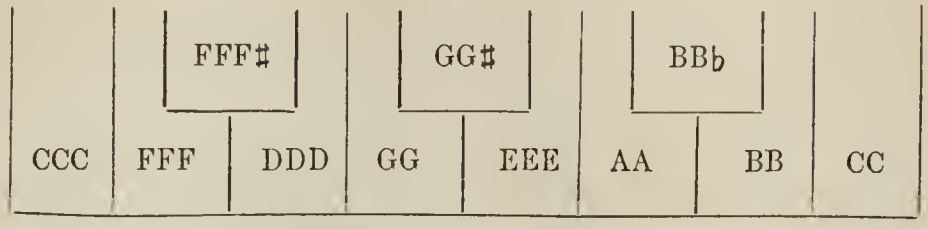
Compass.

Manuals, CC to f^3 in alt.	Pedal, CCC to FF.

120. St. Peter's, at Rome.

So little is generally known in England concerning the Organs of Italy, that it is presumed the following accounts of some of the large Cathedral and celebrated Church Organs of that country will be perused with much interest. It will be perceived, from the particulars relating to the subject, appended to the Specifications in question, that the compass most usually adopted by the Italian Organ-builders for the Manuals of their instruments is that descending to the CCC or 16-feet key. Occasionally this range is met with "complete," as in the Organ at St. Alessandro, at Milan, No. 124; and therefore corresponding almost exactly with the downward compass of the Great Organ Manuals at St. Paul's Cathedral; Westminster Abbey; Christ's Hospital; St. Mary, Redcliffe; &c. The Stops of a Manual of such range are just double the size of the usually quoted lengths; that is to say, the Principale (Open Diapason) is 16 feet actual measurement, and not 8; the Ottava (Principal) is 8 feet, and not 4; and so on (see Nos. 124, 127, 128, &c.); and the Pedal Organ of such instruments usually consists of but a very few Stops, as the deeper tones of the Manual serve as a sort of substitute for it in general effects. Sometimes the Manuals are of the compass denominated "CCC short;" that is, they have the 16-feet key for the lowest note, but with certain tones omitted from the scale, and

such an arrangement of the remaining keys, that the Dominant and Tonic notes of F, G, and A, lie side by side, as shown in the following scheme:



Sometimes the Italian Manuals descend to FFF, as in the two large Organs at Milan Cathedral; corresponding with the compass adopted by Green for his Organs at St. George's Chapel, Windsor; Salisbury Cathedral, Greenwich Hospital, &c. The length of the Stops in all such FFF Manuals is half as large again as the corresponding Stops of CC Organs; thus the Manual and Pedal Diapasons are not simply 8 and 16 feet in length, but 12 and 24 feet respectively; see No. 122. In a few instances, CC Manuals are met with; as in two of the Geneva Organs, Nos. 136 and 137; with, of course, a somewhat larger proportionate Pedal Organ, by way of "Bass."

Among other peculiarities in the Italian system of Organ-building, will be noticed that of placing one more Open Diapason (Principale) in the Treble of the Manual than in the Bass, evidently with the view of preserving an equal strength between the upper and lower tones of the gamut, as in the Organs at St. Peter's, at Rome, Milan Cathedral, &c. See Nos. 120, 121, 122, 127, &c. In some instances, this plan for strengthening the acute sounds will be found extended to the Principal (Ottava), as in Organs at Milan, Como, &c. See Nos. 122, 128, 133, &c. Another feature in connection with the Italian schemes is the plan of making a greater number of the small ranks of Pipes draw separately than is the custom in any other country. Thus we find not only the 19th and 22nd frequently appearing as separate Stops, but also the 26th, 29th, and even the 33rd and 36th, disposed in a similar manner. See No. 123, &c. Among the most striking features in the Italian Organs, however, is the constant presence of the Octave and Sub-octave couplers, which so materially increase the number of distinct combinations, as well as augment the general power of instruments possessing them.

In the Church of St. Peter, at Rome, there are *four* Organs; all of which, however, are small for so spacious an edifice. The largest one of the number was originally built about 150 years since, but has recently been reconstructed and enlarged by Priori, an Organ-builder in Rome. It has 2 Manuals and Pedal, and 27 Stops, of which the following are the names. As, however, many of the names are probably new to many English readers, a list of equivalent terms is placed in parallel columns therewith, which will serve to elucidate their meaning:

Great, 17 Stops.

1	—Principale doppio, Soprano e Basso...	Double Diapason, Treble and Bass.
2	Principale 1mo Soprano	First Open Diapason, Treble.
	Principale 1mo Basso	First Open Diapason, Bass.
3	Principale 2ndo Soprano.....	Second Open Diapason, Treble.
	Principale 2ndo Basso.....	Second Open Diapason, Bass.

4—Principale 3zo, Soprano	Third Open Diapason, Treble.
5—Flauto Traverso, Soprano e Bass	German Flute, Treble and Bass.
6—Flauto Tedesca, Soprano	A kind of Clarabella.
7 Ottava Soprano	Octave or Principal Treble.
7 Ottava Basso	Octave or Principal Bass.
8—Duodecima	Twelfth.
9—Decima-quinta	Fifteenth.
10—Ottavini, Basso e Soprano	Piccolo, Bass and Treble.
11—Decima-nona	Nineteenth or Larigot.
12—Vigesima seconda	Twenty-second or Octave Fifteenth.
13—Vigesima-nona	Twenty-ninth or Super-octave Fifteenth.
14—Ripieno di quattro	Chorus or Mixture, IV ranks.
15—Cornetto Soprano, di cinque	Cornet, Treble, V ranks.
16 Tromba Soprano	Trumpet, Treble.
16 Trombone Basso	Trombone, Bass.
17 Corno Inglese, Soprano	English Horn, Treble.
17 Fagotto, Basso	Bassoon, Bass.

Swell, 6 Stops.

18 Principale, Soprano	Open Diapason, Treble.
18 Principale, Basso	Open Diapason, Bass.
19—Ottava	Octave or Principal.
20—Decima-quinta	Fifteenth.
21—Ripieur di cinque	Mixture, V ranks.
22—Oboe, Soprano	Hautboy, Treble.
23 Tromba, Soprano	Trumpet, Treble.
23 Corno, Basso	Horn, Bass.

Pedal, 4 Stops.

24—Contra-Basso, di 16	Open Diapason, wood .... 16 feet.
25—Principale, di 16	Diapason ..... 16 feet.
26—Principale, di 8	Principal ..... 8 feet.
27—Reinforza a lingue	Free Reed, without tubes . 16 feet tone.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	6, 7, 8—Three Composition Pedals.
2—Coupler, Great to Pedal.	9—Drum Pedal.
3—Coupler, Swell to Pedal.	
4, 5—Octave and Sub-octave on Great Manual.	

Compass.

Manual, CCC, short, to f^3 in alt.	Pedal, CCC, short, to Tenor c.

121. Rome.

The Organ that ranks as second in point of size in St. Peter's, at Rome, was built by Priori, of that city, and has 1 Manual and Pedal, and 21 Stops, of which the following is a list:

Manual, 17 Stops.

1—Contra-Bassi, Soprano e Basso.	3—Principale, 2ndo Soprano.
2 Principale, 1mo Soprano.	4—Flauto Traverso, Soprano e Basso.
2 Principale, Basso.	5—Flauto Tedesco, Soprano.

6 { Ottava, Soprano. / Ottava, Basso.
7—Duodecima.
8—Decima-Quinta.
9—Ottavini ne Basso.
10—Decima Nona.
11—Vigesima Seconda.
12—Vigesima Nona.
13—Ripieno di cinque.
14—Cornetto di quattro, Soprano.
15—Voce Umana (*not* a reed).
16 { Tromba, Soprano. / Trombone, Basso.
17 { Corno Inglese, Soprano. / Fagotto, Basso.

Pedal, 4 Stops.

18—Contra-Basso .. di 16.
19—Principale .... di 8.
20—Ottava ..... di 4.
21—Bombarde .... di 16.

Accessory Stop .. Drum.

The Church of St. John of Lateran, at Rome, has an Organ of 36 Stops. It was first built in 1549, and is the largest instrument in the city.

122. Milan Cathedral.

In Milan Cathedral there are two Organs, one on each side the Choir; both of which are exceedingly effective, and suit admirably the noble building in which they are placed. Neither of them contain any Reed Stops: Stops of that nature being expressly forbidden by the Ambrosian rite. Both instruments were made by the brothers Serassi, of Bergamo. That which stands on the north-side of the Choir was completed in 1842, has one Manual and Pedal, and the following Stops:

Manual, 28 Stops.

1 { Doppio nè Soprani, di 24 Piedi. (Double Treble.) / Contra-Basso, di 24 Piedi. (Double Bass.)
2 { Principale 1mo Soprano. (Open Treble.) / Principale 1mo Basso. (Open Bass.)
3 { Principale 2ndo Soprano. (Open Treble.) / Principale 2ndo Basso. (Open Bass.)
4 { Principale 3zo. Soprano. (Open Treble.)
5 { Violone-Soprano..... ..(Violin.) / Violono-Basso.....(Base.)
6 { Flautone, Soprano. (Met. St. Dn.) / Flautone, Basso. ..(Stopped Bass.)
7—Flauto Tedesca . . . . ..(Clarabella.)
8 { Ottava 1mo. Soprano. (Prin. Tre.) / Ottava 1mo. Basso .. (Prin. Bass.)
9 { Ottava 2ndo Soprano..(Prin. Tre.) / Ottava 2ndo Basso .. (Prin. Bass.)
10—Ottava 3zo Soprano...(Prin. Tre.)
11 { Viola-Soprano ...(Octave Gamba.) / Violoncello-Basso .. (Gamba Bass.)
12—Flauto Traverso..(German Flute.)
13—Duodecimo .....(12th.)
14—Decima Quinta, 1mo. ....(15th.)
15—Decima Quinta, 2ndo .....(15th.)
16—Flautino.....(Piccolo.)
17 { Decima nona, e .... } 1mo. / Vigecima Seconda... } (19 & 22.)
18 { Decima nona, e..... } 2ndo. / Vigesima Seconda... } (19 & 22.)
19 { Vigesima sesta, e.... } (26 & 29.) / Vigesima nona..... }
20 { Vigesima Quarto, e.. } (24 & 17.) / Decima Settima..... }
21 { Trigesima Terza, e.. } (33 & 36.) / Trigesima sesta ..... }
22 { Trigesima prima, e.. } (31 & 36.) / Trigesima sesta..... }
23—Ripieno di quatro (Mixture IV rks.)
24—Ripieno di tre (Mixture III ranks.)
25—Cornetto-Soprano, a cinque (Cornet V ranks.)
26—Cornettino-Sop: a quattro (small Cornet IV ranks.)
27—Corno dolce, Soprano..(Soft Horn.)
28—Voce Humana, Sop...(not a reed.)

Pedal, 4 Stops.

29—Contra Basso..... 24 feet.
30—Basso Profondo .... 24 feet.
31—Ottava ..... 12 feet.
32—Principale..... 12 feet.

Accessory Stops, Movements, &c.

1—Terzo Mano (third-hand, octave Coupler.)
2—Pedali armonichi (Pedal Coupler.)
3—Tremblant.
4, 5—Two Composition Pedals.

Compass.

Manual, FFF to f^3 in alt, complete. | Pedal, FFF to Tenor c, complete.

123. Milan Cathedral.

The Organ on the South side of the Choir has 2 Manuals and 29 Stops, of which the following is a list:

Great, 21 Stops.

1—Contra-bassi.
2—Principale 1mo Soprano.
Principale 1mo Basso.
3—Principale 2ndo Soprano.
Principale 2ndo Basso.
4—Flauto Traverso.
5—Ottava Soprano.
Ottava Bassi.
6—Ottava Soprano.
Ottava Bassi.
7—Flauto in Ottava.
8—Duodecima.
9—Quinta decima.
10—Decima nona.
11—Vigesima seconda.
12—Vigesima sesta.
13—Vigesima nona.
14—Vigesima sesta e nona.
15—Trigesima terza.
16—Trigesima sesta.
17—Trigesima terza e sesta.
18—Quadragesima, e
Quadragesima terza.
19—Cornetta Primo.
20—Cornetta Secunda.
21—Voce Umana.

Positif, 8 Stops.

22—Principale Soprani.
Principale Bassi.
23—Flauto Soprani.
24—Ottava Soprani.
Ottava Bassi.
25—Quinta decima.
26—Decima nona.
27—Vigesima secunda.
28—Vigesima sesta.
29—Vigesima nona.

Accessory Stops, Movement, &c.

1—Bassi armonici ne Pedali.
2—Terzo Mano.
3—Sub-octave Coupler.
4—Piano and Forte movement.

Compass.

Manuals, FFF to g^3 in altissimo. | Pedal Clavier, FFF to Tenor b.

124. Milan.

The Organ in the Church of St. Alessandro, at Milan, has 49 Stops, 2 Manuals, and a Pedal of 10 Stops. The following is its specification:

Great, 24 Stops.

1 Principale Soprano 1mo.. 32 feet.
1 Principale Basso 1mo.... 32 feet.
2 Principale Sop. e Basso 2ndo..... 32 feet.
3—Violone Basso al CC.... 32 feet.
4 Principale Soprano 1mo.. 16 feet.
4 Principale Basso 1mo.... 16 feet.
5 Principale Soprano 2ndo.. 16 feet.
5 Principale Basso 2ndo... 16 feet.
6 Viola Soprano..... 16 feet.
6 Viola Basso..... 16 feet.
7—Corno Flauto..... 16 feet.
8 Ottava Soprano 1mo.... 8 feet.
9 Ottava Basso 1mo..... 8 feet.
—Ottava Sop. e Basso..... 8 feet.
10 Flauto Soprano..... 8 feet.
10 Flauto Basso..... 8 feet.
11 Violino Soprano..... 8 feet.
11 Basso Viola..... 8 feet.
12—Quinta decima 1mo..... 4 feet.
13—Quinta decima 2ndo .... 4 feet.
14—Decima nona..... 3 feet.
15—Ottavino..... 2 feet.
16—Ripieno di due.
17—Ripieno di quattro.
18—Ripieno di tre.
19—Ripieno di quattro.
20—Corno Inglese..... 32 feet.
21 Tromba Soprano..... 16 feet.
21 Tromba Basso..... 16 feet.
22 Clarinetto Soprano .... 16 feet.
22 Fagotto Basso..... 16 feet.
23—Tromba allemanno Basso 16 feet.
24—Tromba Armoniche.... 8 feet.

Swell, 15 Stops.

25 Principale, Soprano..... 16 feet.
25 Principale, Basso..... 16 feet.
26 Voce flebile, Soprano 1mo. 16 feet.
26 Voce flebile, Basso..... 16 feet.
27—Voce flebile, Sop. 2ndo .. 16 feet.
28 Violetta, Soprano 1mo... 16 feet.
28 Violoncello Basso ..... 16 feet.
29—Violetta, Soprano 2ndo . 16 feet.
30—Ottava..... 8 feet.
31—Flauto Traverso, Soprano 8 feet.
32—Viola Basso..... 8 feet.
33—Decima quinta..... 4 feet.
34—Decima nona..... 3 feet.
35—Vigesima seconda..... 2 feet.
36—Vigesima sesta e nona.
37—Clarinetto, Soprano..... 16 feet.
38—Fagottone, Basso..... 32 feet.
39—Claroone, Basso..... 8 feet.

Pedal, 10 Stops.

40—Violone profondo..... 32 feet.
41—Contrabassi e rinforzi.... 16 feet.
42—Violoncello a lingur in la.. 16 feet.
43—Bassi armonichi e duodecima.
44—Principali e ottava .....8 & 4 feet.
45—Ripieno a tre ..... 8, 6, & 4 feet.
46—Bombardi..... 16 feet.
47—Tromboni..... 8 feet.
48—Corni da caccia..... 4 feet.
49—Timpani.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Seraphine, or Fisarmonica, on a separate wind.
4—Thunder Pedal.
5—Drums.
6, 7, 8, Three Composition Pedals.

Compass.

Great, CCC to c^4 in altissimo, six complete octaves.
Swell, CC to c^4 in altissimo, five complete octaves.
Pedal, CCC to Tenor c, two complete octaves.

125. Milan.

The Organ in the Church of St. Maria Della Grazia, at Milan, stands on the north side of the Choir. It contains 18 Stops, 1 Manual, and a Pedal Clavier, but no Pedal Stops. The instrument was made by Maroni, of Varasi, in 1832. The following is a list of its contents:

Manual, 18 Stops.

1—Contra Bassi.
2 { Principale Soprano 1mo. / Principale Basso 1mo.
3 { Principale Soprano 2ndo. / Principale Basso 2ndo.
4—Flauto Traverso.
5—Violoncello Basso.
6 { Ottava Soprano. / Ottava Basso.
7—Flauto in ottava.
8—Flauto in XII, Soprano.
9—Quinta decima.
10—Decima nona.
11—Vigesima seconda.
12—Vigesima sesta e nona.
13—Trigesima terza e sesta.
14 { Quadragesima e / Quadragesima terza.
15—Cornetta.
16 { Trombe Soprano. / Tromboni Basso.
17—Voce Umana, Soprano.
18—Fagotto Basso.

Compass.

Manual, FFF to g^3 in altissimo. | Pedal Clavier, FFF to Gamut A.

Accessory Stops, Movements, &c.

1—Terzo Mano.
2—Bassi D'Armonica.
3, 4—Two Composition Pedals.

126. Milan.

The Organ in the Church of St. Raphael, in Milan, was built by Fratelli and Prestinari, in Magenta. It contains 16 Sounding Stops, of which the following is a list:

Manual, 15 Stops.

1 { Principale Soprani .. 16 feet. / Principale Bassi .... 16 feet.
2 { Principale Soprani, 2nda. / Principale Bassi, 2nda.
3—Principale, 3zo.
4—Fluta spiegala.
5 { Ottava Soprani. / Ottave Bassi.
6 { Flauto in 8 ne Soprani. / Flauto in 8 ne Bassi.
7—Duodecima.
8—Quinta decima.
9 { Decima nona, e. / Vegesima seconda.
10—Vigesima sesta e nona.
11—Trigesima terza e sesta.
12—Cornetto a tre voce.
13—Trombe de ottava soprano ne Basso.
14—Voce Umana.
15—Fagotto Bassi.

Pedal, 1 Stop.

Contra Bassi, ed Ottava.

Accessory Stops, Movements, &c.

1—Movemento che raddopia l'armonica.
2—Bassi armonica ne Pedali.
3, 4—Two Composition Pedals.

Compass.

Manual, CCC short, to a^3 in altissimo. | Pedal, CCC short, to Tenor c.

127. Como.

There are two Organs in the Cathedral at Como. The oldest was built in 1596, and was afterwards much improved, but is now unplayable. The other was erected in 1650, by Hermann, a Jesuit, and is of exquisite tone. It has 3 Manuals and Pedal, and 48 Stops, of which the following is a list:

Great Organ, 20 Stops.

1—Principale Soprano ..	32 feet.	11—Duodecima	6 feet.
2—Principale Soprano e Basso	32 feet.	12 { Quinta decima Soprano	4 feet.
		{ Quinta decima Basso..	4 feet.
3 { Principale Soprano, 1mo.	16 feet.	13—Ottavius Soprano	4 feet.
{ Principale Basso, 1mo.	16 feet.	14—Decima nona	3 feet.
4 { Principale Soprano, 2ndo.	16 feet.	15—Vigesima seconda ...	2 feet.
{ Principale Basso, 2ndo.	16 feet.	16—Ripieno di quattro.	
5—Principale Soprano, 3zo.	16 feet.	17—Ripieno di quattro.	
6—Flauto Soprano.....	16 feet.	18 { Tromba Soprano	16 feet.
7—Viola, Basso profonda .	16 feet.	{ Tromba Basso	16 feet.
8 { Ottava Soprano, 1mo .	8 feet.	19 { Trombe di caccia Soprano	16 feet.
{ Ottava Basso, 1mo...	8 feet.	{ Fagotto Basso	16 feet.
9—Ottava Soprano e Basso	8 feet.	20—Voce Umana, Soprano.	16 feet.
10—Flauto in ottava, Soprano e Basso....	8 feet.		

Choir Organ, 17 Stops.

21 { Principale Soprano ..	16 feet.	28—Flagioletta Soprano ..	4 feet.
{ Principale Basso	16 feet.	29—Decima nona	3 feet.
22—Principale Soprano ..	16 feet.	30—Vigesima seconda....	2 feet.
23—Flauto allemanno, Sop.	16 feet.	31—Vigesima sesta e nona.	
24 { Violino Soprano	16 feet.	32—Trigesima terza e sesta.	
{ Violone Basso	16 feet.	33—Cornetto Soprano, di cinque.	
25 { Ottava Soprano	8 feet.	34—Corno Inglese Soprano .	32 feet.
{ Ottava Basso	8 feet.	35 { Oboe Soprano	16 feet.
26 { Flauto in ottava, Sop..	8 feet.	{ Violoncello Basso (a Reed)	16 feet.
{ Flauto Basso	8 feet.	36—Voce Umana, Soprano.	16 feet.
27—Quinta-decima.....	4 feet.	37—Tromba armoniche, Basso	8 feet.

Swell Organ, 7 Stops.

38 { Principale Soprano ..	16 feet.	41—Corno dolce, Soprano .	32 feet.
{ Principale Basso	16 feet.	42—Corno Bassetto, Soprano	32 feet.
39—Flauto in ottava ...	8 feet.	43—Voce Umana, Soprano.	16 feet.
40—Ripieno di cinque.		44—Fagottone. Basso	16 feet.

Pedal Organ, 4 Stops.

45—Contra Bassi con rinforzi	32 & 16 feet.	47—Bombardone	16 feet.
		48—Tromboni.....	8 feet.
46—Contra Bassi dolci .. (stopped).....	16 feet.		

Accessory Stops, Movements, &c.

1—Coupler, Choir to Great.	4, 5—Octave and Double Couplers.
2—Coupler, Swell to Great.	6, 7, 8—Three Composition Pedals.
3—Coupler, Great to Pedal.	9—Drums.

Compass.

Manuals, CCC short, to f^3 in alt. | Pedal, CCC short, to Tenor d.

128. Como.

The Organ in the Church of the Santissimo Crocifisso, at Como, was built by the brothers Serassi, of Bergamo. It has 2 Manuals, a Pedal of 8 Stops, and 39 Stops, of which latter the following is a list:

Great, 24 Stops.

1	Principale Soprano ..	32 feet.	13—Duodecima ..... 6 feet.
	Principale Basso	32 feet.	14 Quinta Decima, Soprano 4 feet.
2—Principale Soprano ..		32 feet.	Quinta Decima, Basso . 4 feet.
3—Corno dolce		32 feet.	15—Decima nona ..... 3 feet.
4	Principale Soprano, 1mo.	16 feet.	16—Vigesima Seconda ... 2 feet.
	Principale Basso, 1mo.	16 feet.	17—Ripieno di quattro.
5—Principale Soprano, 2ndo.		16 feet.	18—Ripieno di quattro.
6—Principale Soprano, 3zo.		16 feet.	19—Cornetto di cinque.
7—Flauto Traverso Soprano		16 feet.	20—Corno Inglese, Soprano 32 feet.
8—Violone Basso		16 feet.	21—Tromba Soprano .... 16 feet.
9—Ottava Soprano e Basso		8 feet.	22—Fagotti Basso ..... 16 feet.
10—Ottava Soprano		8 feet.	23—Voce Umana, Soprano . 16 feet.
11—Viola Basso		8 feet.	24—Clarone, Basso ..... 8 feet.
12	Flauto ottava, Soprano	8 feet.	
	Flauto ottava, Basso..	8 feet.	

Swell Organ, 8 Stops.

25	Principale Soprano ..	16 feet.	28—Flauto in ottava .... 8 feet.
	Principale Basso	16 feet.	29—Decima quinta e nona.
26—Corna Musa.....		16 feet.	30—Ripieno di tre.
27	Ottava Soprano	8 feet.	31—Cornettino di tre, Soprano.
	Ottava Basso	8 feet.	32—Serpentino Bass, al CC. . 32 feet.

Pedal Organ, 8 Stops.

33—Contra-bassi, al sol.. (GGG)		32 feet.	36—Ripieno, di cinque.
			37—Bombardi ..... 16 feet.
34—Contra-bassi con rinforzi		16 feet.	38—Tromboni..... 8 feet.
			39—Trombe ..... 4 feet.
35—Ottava.....		8 feet.	

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	6—Timpani.
2—Coupler, Great to Pedal.	7—Bells.
3—Coupler, Swell to Pedal.	8—Thunder.
4—Octave Coupler.	9, 10—Two Composition Pedals.
5—Sub-octave Coupler.	

Compass.

Manuals, CCC short, to f^3 in alt.	Pedal, CCC short, to Tenor c.

129. Florence.

The Organ at the Church of the Badia, at Florence, is about 200 years old.

It has only one Manual, and no Pedal Stops; yet it is very effective, though so small. The following is a list of its Stops:

Manual, 8 Stops.

1—Principale.
2—Flauto (remarkably good).
3—Ottava.
4—Decima quinta.
5—Decima nona, e Vigesima seconda.
6—Cornetto.
7—Tromba Soprano
Tromba Basso.
8—Fis-armonica or Seraphine, on separate wind.

Accessory Stops, Movements, &c.

1, 2—Octave and Sub-octave Couplers.
3, 4—Two Composition Pedals.
5—Bells.

Compass.

Manual, CCC short, to c^3 in alt.
Pedal Clavier, CCC short, to DD.

130. Florence.

The Organ in the Church of St. Marco, at Florence, is, like the one last mentioned, a most effective instrument, though small. It has but one Manual, and no separate Pedal Stops. The following is a list of its contents:

Manual, 9 Stops.

1—Principale, Soprano.
Principale, Basso.
2—Flauto, Soprano e Basso.
3—Ottava.
4—Decima quinta.
5—Decima nona, e Vigesima second.
6—Cornetto.
7—Tromba, Soprano.
Tromba, Basso.
8—Voce Umana.
9—Fis-armonica, on separate wind.

Accessory Stops, Movements, &c.

1, 2—Octave and Sub-octave Couplers.
3, 4, 5—Three Composition Pedals.

Compass.

Manual, CCC short, to g^3 in altissimo.
Pedal Clavier, CCC short, to FF.

131. Florence.

The Organ in the Church of St. Gætano, at Florence, has 3 Manuals, embracing 33 Stops, and a very good Contra-basso on the Pedal. The following is a list of the Stops:

Great, 14 Stops.

1	Principale, Soprano	8 feet.	
	Principale, Basso	8 feet.	
2	Ottava	4 feet.	
3	Flauto	4 feet.	
4	Nasardo	3 feet.	
5	Decima quinta	2 feet.	
6	Flautino, Soprano e Basso	2 feet.	
7	Decima nona	1½ foot.	
8	Vigesima seconda	1 foot.	
9	Ripieno di tre.		
10	Cornetto di tre.		
11	Cornettino di tre.		
12	Tromba, Soprano	8 feet.	
	Tromba, Basso	8 feet.	
13	Voce Umana	8 feet.	
14	Clarone	4 feet.	

Choir, 11 Stops.

15—Corno dolce, Soprano	16 feet.	21—Flautino	2 feet.
16—Principale, Soprano	8 feet.	22—Corno Inglese, Soprano	16 feet.
16—Principale, Basso	8 feet.	23—Tromba, Basso e Soprano	8 feet.
17—Voce Angelica	8 feet.	24—Oboe, Soprano	8 feet.
18—Flautone (metal)	8 feet.	25—Voce Umana, Soprano	8 feet.
19—Ottava	4 feet.		
20—Flauto	4 feet.		

Echo, 8 Stops.

26—Principale	8 feet.	30—Decima quinta	2 feet.
27—Ottava	4 feet.	31—Ripieno di quattro.	
28—Flauto	4 feet.	32—Cornettino di tre.	
29—Nasardo	3 feet.	33—Tromba	8 feet.

Pedal, 1 Stop.

34—Rinforza de Contra-bassi (wood, open) .. 16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Choir to Great.	4—Great Sub-octave Coupler.
2—Coupler, Echo to Great.	5—Great to Pedal.
3—Great Octave Coupler.	6, 7, 8—Three Composition Pedals.

Compass.

Manuals, CC short, to c^3 in alt.	Pedal, CCC short, to Tenor c.

There are very excellent Organs in the Churches of S. Spirito and Santa Croce, at Florence; the particulars of which, however, are not at hand. That in the Church of S. Spirito was lately rebuilt by Ducie, of Florence, and contains some remarkably fine Reeds, and a very effective 16-feet Principale on the Pedal. The Santa Croce Organ is very similar to the last in general effect, but appears to be rather a smaller instrument.

132. Genoa.

The Organ in the Church of Santa Maria des Vignes, at Genoa, was built by the Brothers Serassi, of Bergamo. It has 28 Stops, of which the following is a list:

Manual, 25 Stops.

1—Soprano Doppio.	13—Decima nona.
1—Contra-basso.	14—Vigesima seconda.
2—Principale 1mo Soprano.	15—Vigesima sesta.
2—Principale 1mo Basso.	16—Vigesima nona.
3—Principale 2ndo Soprano.	17—Flagioletti ne Bassi.
3—Principale 2ndo Basso.	18—Trigesima sesta.
4—Flauto Tedesco.	19—Ripieno di quattro.
5—Flauto Francese, Soprano.	20—Ripieno di tre.
6—Ottava, Soprano.	21—Cornetto di cinque.
6—Ottava, Basso.	22—Cornetto di tre.
7—Traverso ottava.	23—Tromba, Soprano.
8—Viola Basso.	23—Trombone, Basso.
9—Duodecima.	24—Cor Anglais, Soprano.
10—Decima Quinta 1mo.	25—Fagotti, Basso.
11—Decima Quinta 2ndo.	26—Timpani.
12—Ottavini.	27—Bells.

Pedal, 1 Stop.

28—Rinforzo de Contra-bassi (open wood) .. 16 feet.

Accessory Stops, Movements, &c.

1—Octave Coupler.
2—Sub-octave Coupler.
3 to 8—Six Composition Pedals.

Compass.

Manual, CCC short, to c^4 in altissimo. | Pedal, CCC short, to Tenor c.

133. Genoa.

The Organ in the Church of S. Ambrogio, at Genoa, was built about 200 years since, by Hermann, the Jesuit; and has lately been enlarged by Giuliani, a Piedmontese builder.

Great, 23 Stops.

1—Contra-basso, Soprano e Basso.
2—Principale Soprano, 1mo. / Principale Basso, 1mo.
3—Principale Soprano, 2ndo. / Principale Basso, 2ndo.
4—Principale Soprano, 3zo.
5—Rinforza nel Basso.
6—Traverso, all unisono, Sop. e Basso.
7—Viola Soprano. / Violoncello Basso.
8—Ottava Soprano, 1mo. / Ottava Basso.
9—Ottava Soprano, 2ndo.
10—Traverso, all ottava, Sop. e Basso.
11—Duodecima.
12—Ottavini.
13—Decima nona.
14—Vigesima seconda.
15—Vigesima nona.
16—Ripieno di quattro.
17—Ripieno di quattro.
18—Cornetto di cinque.
19—Cornetto di quattro.
20—Usignuolo (to imitate a bird).
21—Tromba, Soprano. / Trombone, Basso.
22—Voce Umana.
23—Fagotti, Basso.

Swell, 10 Stops.

24—Corno dolce (large double open, treble).
25—Principale.
26—Flauto Traverso.
27—Ottava.
28—Flauto alla Duodecima.
29—Decima Quinta.
30—Flauto alla Decima Quinta.
31—Ripieno di quattro.
32—Oboe Soprano. / Corno Basso.
33—Rosignuolo (a bird stop).

Accessory Stops, Movements, &c.

1, 2, 3—Three Composition Pedals. | 4—Drum, worked by a Pedal.

Compass.

Great, CCC short, to c^3 in alt.
Swell, CC to c^3 in alt.
Pedal, CCC short, to Tenor c.

134. Genoa.

The Organ in the Carigrana Church, at Genoa, was built by Hermann. It contains 3 Manuals and 42 Stops, of which the following is a list:

Great, 25 Stops.

1—Contra-basso, Soprano e Basso.
2—Contra-basso, Soprano.
3 { Principale Soprano 1mo. / Principale Basso 1mo.
4 { Principale Soprano 2ndo. / Principale Basso 2ndo.
5—Principale Soprano 3zo.
6—Flauto Traverso, Sop. e Basso.
7—Flauto Tedesco, Sop. e Basso.
8 { Ottava Soprano 1mo. / Ottava Basso.
9—Ottava Soprano 2ndo.
10—Flautino.
11—Duodecima.
12—Decima quinta.
13—Ottavini, Soprano e Basso.
14—Decima nona.
15—Vigesima seconda.
16—Vigesima nona.
17—Trigesima sesta.
18—Sesquialtera di quattro.
19—Ripieno di cinque.
20—Cornetto di quattro.
21—Cornetto di tre.
22 { Tromba Soprano. / Trombone Basso.
23 { Tromba Real, Soprano. / Fagotto Basso.
24—Voce Umana (a Reed).
25—Corna Musa, Soprano.

Choir, 5 Stops.

26—Principale.
27—Flautone.
28—Ottava.
29—Ripieno di cinque.
30 { Vox Pueri, Soprano. / Vox Tauri, Basso.

Echo, 6 Stops.

31—Principale.
32—Corno dolce, Soprano.
33—Ottava.
34—Ripieno, di quattro.
35—Oboe, Soprano.
36—Tromba, Soprano.

Pedal, 6 Stops.

37—Contra Basso, al La(to A A A) 32 feet.
38—Principale ..... 16 feet.
39—Contra Basso ..... 16 feet.
40—Principale ..... 8 feet.
41—Tromba ..... 16 feet.
42—Clarone ..... 8 feet.

Accessory Stops, Movements, &c.

1—Coupler, uniting all the Manuals.
2—Coupler, Great to Pedal.
3, 4, 5—Three Composition Pedals.
6—Bells, on Choir Manual.
7, 8—Two Bird Stops, on Echo Manual.
9—Thunder, by means of a Pedal.
10—Drum, by means of a Pedal.

Compass.

Great, CCC short, to c^3 in alt.
Choir, CCC short, to c^3 in alt.
Swell, CC, to c^3 in alt.
Pedal, CCC short, to Tenor d.

135. Genoa.

The Organ in the Church of St. Felipo Neri, at Genoa, has 21 Stops; of which the following is a list:

Manual, 20 Stops.

1 { Doppio Soprano. / Contra Basso.
2 { Principale 1mo Soprano. / Principale 1mo Basso.
3 { Principale 2ndo Soprano. / Principale 2ndo Basso.
4 { Traverso Soprano. / Flautone Basso.

5—Ottavi.
6—Flautino.
7—Duodecima.
8—Decima quinta.
9—Ottavini, Soprano.
10—Vigesima seconda.
11—Flagioletta Basso (29).
12—Ripieno di quattro.
13—Ripieno di quattro.
14—Cornetto 1mo.
15—Cornetto 2ndo.
16 { Tromba Soprano. / Tromba Basso.
17—Cor Anglais, Soprano.
18—Fagotto, Basso.
19—Voce Umana, Sop. (not a Reed.)
20—Timpani.

Pedal, 1 Stop.

21—Rinforzo de Contra Bassi .. 16 feet.

Accessory Stops, Movements, &c.

1, 2, 3—Three Composition Pedals.

Compass.

Manual, CCC short, to e^3 in alt. | Pedal, one octave only.

136. Geneva.

The Organ in the Cathedral Church of St. Pierre, at Geneva, was built by Gerger, about 150 years since. It has 4 Manuals, a Pedal of 2 octaves, and 45 Stops, of which the following is a list:

Great, 17 Stops.

1—Montre	16 feet.	10—Doublette	2 feet.
2—Grand Bourdon	16 feet tone.	11—Tierce	$1\frac{3}{5}$ foot.
3—Huit Pieds ouverte	8 feet.	12—Cymballe.	
4—Principal	8 feet.	13—Fourniture.	
5—Flute	8 feet.	14—Cornette, V ranks.	
6—Bourdon	8 feet tone.	15 { Trompette des dessus / Trompette des bassus	8 feet. / 8 feet.
7—Prestant	4 feet.		
8—Nazard	3 feet.	16—Clairon	4 feet.
9—Quarte de nazard	2 feet.	17—Voix Humaine	8 feet tone

Choir, 10 Stops.

18—Bourdon	8 feet tone.	23—Cymballe.	
19—Prestant	4 feet.	24—Fourniture.	
20—Flute	4 feet.	25—Cornette.	
21—Doublette	2 feet.	26—Trompette	8 feet.
22—Tierce	$1\frac{3}{5}$ foot.	27—Crom Horn	8 feet tone

Echo, 6 Stops.

28—Bourdon	8 feet tone.	31—Cornette, III ranks.	
29—Prestant	4 feet.	32—Trompette	8 feet.
30—Flute	4 feet.	33—Crom Horn	8 feet tone.

Orgue de Recit. 6 St .

34—Bourdon	8 feet tone.	37—Doublette	2 feet.
35—Flute Allemande	8 feet.	38—Cornette, IV ranks.	
36—Prestant	4 feet.	39—Trompette	8 feet.

Pedal, 6 Stops.

40—16 Pieds ouverte, to GG ..... 16 feet.
41—Bourdon..... 16 feet tone.
42—Huit Pieds ouverte.. 8 feet.
43—Bombarde ..... 16 feet.
44—Trompette ..... 8 feet.
45—Clairon..... 4 feet.

Accessory Stops, Movements, &c.

1—Coupler, Positif to Great.
2—Coupler, Great to Pedal.

Compass.

Great, CC to d^3 in alt.
Positif, CC to d^3 in alt.
Orgue de Recit. Fiddle g to d^3 in alt.
Echo, Middle c^1 to d^3 in alt.
Pedal, CCC to Tenor c.

137. Geneva.

The Organ in another Church at Geneva was built by Mooser, of Freibourg. It has 2 Manuals and Pedal, and the following 22 Stops:

Great Organ, 12 Stops.

1—Montre ..... 16 feet.
2—Bourdon..... 16 feet tone.
3—Principal ..... 8 feet.
4—Flute... ..... 8 feet.
5—Prestant. ..... 4 feet.
6—Nazard ..... 3 feet.
7—Quart de Nazard... 2 feet.
8—Doublette ..... 2 feet.
9—Tierce ..... $1\frac{3}{5}$ foot.
10—Cymballe.. III ranks.
11—Fourniture.. V ranks.
12—Cornet..... V ranks.

Choir Organ, 6 Stops.

13—Bourdon..... 8 feet tone.
14—Gamba .... 8 feet.
15—Prestant..... 4 feet.
16—Flute ..... 4 feet.
17—Flageolet..... 2 feet.
18—Chalumeaux..... 4 feet.

Pedal Organ, 4 Stops.

19—Grand Bourdon, ouvert. 16 feet.
20—Bourdon bouchè .... 16 feet tone.
21—Huit Pieds, ouvert .. 8 feet.
22—Trombone..... 16 feet.

Accessory Stops, Movements, &c.

1—Choir to Great.
2—Great to Pedal.

Compass.

Manuals, CC to f^3 in alt, 54 notes.
Pedal, CCC to Tenor f, 30 notes.

138. Siena.

The Organ in the Cathedral is very small, yet a very effective instrument. It has but 1 Manual and 14 Stops, of which the following is a list:

Manual, 11 Stops.

1 { Principale, Soprano. / Principale, Basso.
2—Flauto Traverso.
3—Ottava.
4—Decima Quinta.
5—Decima nona.
6—Vigesima Seconda.
7—Ripieno di quattro.
8—Cornetto di cinque.
9—Tromba, Soprano e Basso.
10—Corno Inglese.
11—Voce Umana (not a Reed).

Pedal, 3 Stops.

12—Contra Bassi, al La (AAA) ..... 32 feet.
13—Contra Bassi, al La (AA) ..... 16 feet.
14—Rinforza de Contra-Bassi (Trombone) 16 feet.

Compass.

Manual, CCC short, to d^3 in alt. | Pedal, CCC short, to FF.

Accessory Stops, Movement, &c.

1, 2—Manual Couplers, octave above and below.
3—Manual to Pedal.

139. Siena.

The Organ in the Conventual Church at Siena was originally built in 1738; but was rebuilt and enlarged by the Brothers Serassi, of Bergamo, in 1845. It has 1 Manual and Pedal, and 27 Stops, of which latter the following is a list:

Manual, 24 Stops.

1—Contra Basso e doppio ne Soprani ..... 32 feet.
2—Viola, Soprano..... ... 32 feet.
3—Principale 1mo Soprano . 16 feet.
Principale 1mo Basso .. 16 feet.
4—Principale 2ndo Soprano . 16 feet.
Principale 2ndo Basso .. 16 feet.
5—Violino Soprano..... 16 feet.
Violoncello Basso..... 16 feet.
6—Flautino Soprano..... 16 feet.
Flautone Basso ..... 16 feet.
7—Ottava Soprano 1mo.... 8 feet.
Ottava Basso 1mo..... 8 feet.
8—Ottava Soprano 2ndo... 8 feet.
Viola Basso..... 8 feet.
9—Flautino Soprano..... 8 feet.
Flauto Basso..... 8 feet.
10—Duodecima..... 6 feet.
11—Decima-quinta ..... 4 feet.
12—Ottavini, Soprano e Basso 4 feet.
13—Decima nona..... 3 feet.
14—Vigesima seconda..... 2 feet.
15—Vigesima sesta ..... 1½ foot.
16—Vigesima nona ..... 1 foot.
17—Trigesima sesta ..... ½ foot.
18—Ripieno di quattro.
19—Ripieno di tre.
20—Cornetto di cinque.
21—Corno Inglese, Soprano .. 32 feet.
22—Tromba Soprano ..... 16 feet.
Tromba Basso ..... 16 feet.
23—Oboe Soprano ..... 16 feet.
Fagotto Basso ..... 16 feet.
24—Clarone, Sop. e Basso .. 8 feet.

Pedal Organ, 4 Stops.

25—Contra Basso, al La — (AAA) ..... 32 feet.
26—Contra Basso ..... 16 feet.
27—Principale ..... 8 feet.
28—Bombardone ..... 16 feet.

Accessory Stops, Movements, &c.

1, 2—Octave Manual, above and below.
3—Coupler, Manual to Pedal.
4—Bells.
5—Glasses.
6—Cymbals.
7—Drums.
8—Thunder.

Compass.

Manuals, CCC short, to g^3 in altissimo. | Pedal, CCC short, to Tenor c.

140. Seville.

The large Organ in Seville Cathedral has frequently been extolled by tourists for its magnitude and great power. There are several Organs in the Cathedral, the two principal of which stand, sideways, one on each side the Choir, and opposite each other. Each of these has a complete and beautifully adorned front, both behind as well as before; and also a handsome "Choir Organ in front," not only towards the Choir, but also another towards the Aisle. The Reed Stops, which are unexampled for their number, are placed outside the Organs, and project horizontally from the several fronts in 2, 3, and 4 tiers The largest Pipes are uppermost, and are supported by iron bars. The Mouths of the tubes are Trumpet-shaped.

The older of the two chief Organs is the largest. According to most accounts, this has 110 Stops and 5300 Pipes. It is evident, however, that many of the Stops are, like those in the Italian Organs, just described, only "Half Stops." By no other means could such an aggregation of Stops be accounted to comprise a number of Pipes inferior to that contained in the Rotterdam, Weingarten, and some other Organs which have at the same time 30 or 40 Stops less than the Seville Organ. Still less could it otherwise be explained how there can be *two* "first" Mixtures, *two* "second" Mixtures, and so forth. The following account and translation of the large Seville Organ have been prepared from memorandums made from the Draw-Stop handles by J. W. Fraser, Esq. of Manchester, and forwarded to Mr. Hill, the eminent Organ-builder, who kindly furnished them to the writer. The figures 13, 26, and 52, attached to certain Stops, seem to correspond with the signs 8, 16, and 32, in the German tablature, in marking the size of the large Foundation Stops.

Great, 42 Stops; 62 Draw-Stops.

1	Flauto de 26	Double Diapason. (Treb.)
	Flauto de 26	Double Diapason. (Bass.)
2—Flauto de 26		Double Diapason. (Treb.)
3	Violon de 26	Gamba Major, or Double Gamba. (Treb.)
	Violon de 26	Gamba Major, or Double Gamba. (Bass.)
4	Tolosana de 26	Double Stop; probably either invented or first made at Tolouse, and hence named after that place.
	Tolosana de 26	
5	Baxoncillo	Open Diapason. (T.)
	Baxoncillo	Open Diapason. (B.)
6	Baxoncillo	Open Diapason. (T.)
	Baxoncillo	Open Diapason. (B.)

"Baxon" is a Bassoon, and "illo" implies diminution; but the Baxoncillo Stop is known to be the equivalent to the English Open Diapason.

7—Baxoncillo		Open Diapason. (Treb.)
8	Tapadillo	Stopped Diapason. (Treb.)
	Tapadillo	Stopped Diapason. (Bass.)
9—Tapadillo		Stopped Diapason. (Treb.)
10	Flauta de 13	Unison Flute. (Treb.)
	Flauta de 13	Unison Flute. (Bass.)
11—Flauta de 13		Unison Flute. (Treb.)
12—Flauta Traversa		German Flute. (Treb.)
13	Violon de 13	Gamba. (Treb.)
	Violon de 13	Gamba. (Bass.)
14—Violon de 13		Gamba. (Treb.)

15	Tolosana	Unison Stop. See No. 6 above.
16	Docena de 26	Twelfth to the 26-feet Stops.
17	Octava	Fifth to the 13-feet Stops. Quint.
	Octava	Octave or Principal. (Treb.)
18	Octava	Principal. (Bass.)
19	Docen y 26°	Principal.
20	Quincena	Twelfth and 26th (Octave Larigot).
21	Lleno 1°	Fifteenth.
	Lleno 1°	First Mixture. (Treb.)
22	Lleno 2°	First Mixture. (Bass.)
	Lleno 2°	Second Mixture. (Treb.)
23	Lleno	Second Mixture. (Bass.)
24	Corneta	Mixture.
25	Corneta	Cornet.
26	Trompa de 52	Cornet.
27	Trompa de 26	Double Double Trumpet.
	Trompa de 26	Double Trumpet. (Treb.)
28	Trompa Real	Double Trumpet. (Bass.)
	Trompa Real	Royal or Grand Trumpet. (Treb.)
29	Trompa Real	Royal or Grand Trumpet. (Bass.)
	Trompa Real	Royal or Grand Trumpet. (Treb.)
30	Trompa de Batalla	Royal or Grand Trumpet. (Bass.)
	Trompa Magna	Battle Trumpet. (Treb.)
31	Trompa 8	Great Trumpet. (Bass.)
32	Oboe	Octave Trumpet, probably.
	Fagot	Hautboy.
33	Cremona	Bassoon.
34	Vox de 13	Cremona.
35	Viejos	Vox Humana.
	Viejos	"Viejos," the eyebrows. This Stop takes its name from the shape of the cover or plug at the top of the Pipe.
36	Clarin Real	Royal or Grand Clarion. (Treb.)
	Clarin Real	Royal or Grand Clarion. (Bass.)
37	Clarin Real	Royal or Grand Clarion.
38	Clarin de Batalla	Battle Clarion. (Treb.)
	Clarin de Batalla	Battle Clarion. (Bass.)
39	Clarin Claro	Clear Clarion.
40	Clarin en 15	Octave Clarion. (Treb.)
	Clarin en 15	Octave Clarion. (Bass.)
41	Clarin en 15	Octave Clarion.
42	Orlo	Orlo, a shawm; the "Cink" of Dutch and "Zincke" of German Organs. The original instrument exists only in the German saying, "in Heaven the Angels only play Fiddles and Shawms."

Forte de Echo, 10 Stops, 12 Draw-Stops.

43	Baxoncello	Open Diapason.
44	Tapadillo	Stopped Diapason.
45	Flauta Traverso	German Flute.
46	Flauta	Flute.
47	Corneta	Cornet.
48	Trompa Real	Grand Trumpet.
	Trompa Magna	Great Trumpet.

49—Trompa Bastarda	"Bastarda," a piece of ordnance. Bombarde or Great Reed. Probably a Double Trumpet.
50—Vox Contralto	Contralto Voice.
51 { Oboe	Hautboy.
51 { Fagot	Bassoon.
52—Clarin sordina	Soft Clarion.

Echo, 12 Stops, 14 Draw-Stops.

53—Baxoncello	Open Diapason.
54—Tapadillo	Stopped Diapason.
55—Violon de 13	Gamba.
56—Tolosana	Unison Stop.
57—Flauta Traversa	German Flute.
58—Flauta de 13e 8va	Flute, of Octave as well as Unison pitch.
59—Docena	Twelfth.
60—Quincena	Fifteenth.
61—Lleno	Mixture.
62—Corneta	Cornet.
63 { Trompa Real	Royal Trumpet.
63 { Trompa Magna	Great Trumpet.
64 { Vox de 13	Vox Humana.
64 { Vox Contralto	Contralto Voice.

Contra Pedale, 7 Stops.

65—Trompa de 26	Trumpet of 26 feet.
66—Trompa de 26	Trumpet of 26 feet.
67—Trompa de 13	Trumpet of 13 feet.
68—Trompa de Octave	Octave Trumpet ($6\frac{1}{2}$ feet).
69—Trompa de 12	Twelfth Trumpet ($4\frac{1}{3}$ feet).
70—Trompa en 15	Fifteenth Trumpet ($3\frac{1}{4}$ feet).
71—Trompa en 17	Tierce Trumpet.

Compass.

Manuals, CC to g^3 in altissimo. | Pedal, One Octave.

The above Organ has several more Stops, the names of which are not on the Stop-handles. These are probably Couplers, Wind-valves, and other Accessory Stops.

Great	42 Stops.	62 Draw-Stops.
Forte de Echo	10	12
Echo	12	14
Pedal	7	7
Couplers, wind-valves, &c.		15
	71	110

The mode of blowing the bellows of the above Organ is peculiar. Instead of working with his hands, a man walks backwards and forwards along an inclined plane of about 15 feet in length, which is balanced in the middle on its axis. Under each end is a pair of bellows, of about 6 feet by $3\frac{1}{2}$ feet. These communicate with

five other pair, united by a bar; and the latter are so contrived that, when they are in danger of being overstrained, a valve is lifted up and gives them relief.

Passing ten times along the inclined plane fills all these vessels; which are so ample that, when stretched, they supply the full Organ fifteen minutes.

141. Seville.

The second Organ in Seville Cathedral has 71 Draw-Stops, 3 Manuals, and Pedal. The contents of the several Manual Organs were not placed separately in the memorandum from which the following account was prepared:

Manual Stops.

1—Violata	Small Viol, or Gambette.
2—Baxoncello	Open Diapason.
3—Trompeta de Batalla	Battle Trumpet.
4—Viejos	See 35 in No. 140.
5—Orlo	Cink. A small Reed.
6—Clarin en 22ª	Super octave Clarion.
7—Clarin en 15ª	Octave Clarion.
8—Clarin Claro	Clear Clarion.
9—Clarin de Campana	Hunting Horn.
10—Chirimia	Clarion.
11—Violata suave	Soft Viola.
12—Baxoncello	Open Diapason.
13—Trompeta en 15	Octave Clarion.
14—Trompeta en 8	Clarion.
15—Trompeta en 26	Double Trumpet.
16—Mudo	Mute. Wind-valve?
17—Nasardo	Twelfth.
18—Corneta de 26	Double Reed .. 26 feet.
19—Octava de Nasardo	Nineteenth, or Larigot.
20—Quincena Tapada	Stopped Fifteenth. Stopped Piccolo
21—Octava Tapada	Stopped Octave. Stopped Flute.
22—Violon de 13	Gamba.
23—Lleno de 8	Mixture.
24—Diezmonovena	Nineteenth, or Larigot.
25—Quincena	Fifteenth.
26—Docena	Twelfth.
27—Octava	Octave, or Principal.
28—Flauta de 13	Unison Flute.
29—Flautada de 13	Large Unison Flute.
30—Flautada de 26	Double Diapason.
31—Violon.	
32—Contra-baxo	Double Bass.
33—Clarin en 15ª	Octave Clarion.
34—Baxoncello	Open Diapason.
35—Trompeta Real	Grand Trumpet.
36—Trompeta Real	Grand Trumpet.
37—Tolosana	Unison Stop.
38—Lleno	Mixture.
39—Diezmonovena	Nineteenth, or Larigot.
40—Quincena	Fifteenth.

41—Docena	Twelfth.
42—Octava	Octave.
43—Flautada de 13	Large Unison Flute.
44—Preparacion	Preparation. Probably a wind-valve; or a bell to give notice to the blower.
45—Trompa	Trumpet.
46—Serpenton	Great Serpent. Double Reed.
47—Vox Humana	Vox Humana.
48—Clarin en 15	Octave Clarion.
49—Clarin de sordino	Soft Clarion.
50—Clarinete	Clarinet.
51—Fagot	Bassoon.
52—Nasardo en 19^a	Twelfth and Larigot.
53—Nasardo en 17^a	Twelfth and Tierce. Sesquialtera.
54—Nasardo en 15^a	Twelfth and Fifteenth. Rausch-quint.
55—Lleno	Mixture.
56—Diezmonovena	Larigot.
57—Quincena	Fifteenth.
58—Octava	Principal.
59—Violon de 13	Gamba.

Pedal, 9 Stops.

60—Flautada de 26	Great Flute or Diapason of	26 feet.
61—Contra de 26	Double, of	26 feet.
62—Contra 8	Double Octave.	
63—Contra 15	Double 15.	
64—Contra 22	Double 22.	
65—Contra 29	Double 29.	
66—Bombarda de 26	Great Reed	26 feet.
67—Bombarda de 13	Great Reed	13 feet.
68—Contra de Clarin	Great Clarion	$6\frac{1}{2}$ feet.

69, 70, 71—Three Stops without names.

Compass.

Manuals, AA to c^4 in altissimo, $5\frac{1}{3}$ octaves.

A very large Organ has lately been completed in the Great Church at Berne, in Switzerland, which is described as being a particularly fine instrument.

Another and still larger Organ, to contain, it is said, 100 Stops, is now in course of completion in the Cathedral at Ulm. It is being constructed by the celebrated builder, Walker, of Ludwigsburg.

America.

The following particulars concerning a few recently constructed American Organs will convey some idea of what has lately been going on in the matter of Organ-building in the United States.

142. New York.

The new Organ in Trinity Church, New York, was built by Mr. Henry Erben, from a Specification prepared by Dr. Hodges. It has 31 Sounding Stops and 11

Couplers; 3 Manual Organs, of 16, 8, and 4 feet compass respectively; a Swell Bass of 2 Stops, and a 32-feet Pedal Stop. The instrument, which stands at the west end of the Church, is enclosed in a bold Gothic case, designed by Richard Upjohn, Esq. the architect of the Church. The Choir Organ is in front, and has an 8-feet speaking front; while the Great Organ has a 16-feet speaking front. The following is a list of the Stops in the above-named instrument:

Great, 12 Stops.

1—Open Diapason.	7—Twelfth.
2—Open Diapason.	8—Fifteenth.
3—Stopped Diapason.	9—Sesqui-altera..III ranks.
4—Principal.	10—Mixture .....III ranks.
5—Principal.	11—Trumpet.
6—Large Flute.	12—Clarion.

Choir, 7 Stops.

13—Dulciana.	17—Fifteenth.
14—Stopped Diapason.	18—Clarionet..(half Stop).
15—Principal.	19—Bassoon...(half Stop.)
16—Flute.	

Swell, 9 Stops.

20—Double Stopped Diapason.	25—Cornet, V ranks.
21—Open Diapason.	26—Hautboy.
22—Stopped Diapason.	27—Trumpet.
23—Dulciana.	28—Clarion.
24—Principal.	

Swell Bass, 2 Stops.

29—Dulciana.	30—Serpent.

Pedal, 1 Stop.

31—Double Open Diapason, 32 feet.

Couplers.

1—Swell to Great.	7—Great to Pedal, 8-feet pitch.
2—Swell and Great at octaves.	8—Choir to Pedal.
3—Swell to Choir.	9—Swell Bass to Pedal.
4—Choir to Great.	10—Pedal Pipes in 32-feet pitch.
5—Choir and Swell at octaves.	11—Pedal Pipes in 16-feet pitch.
6—Great to Pedal, 16-feet pitch.	

Compass.

Great, CCC to f^3 in alt, 66 keys, 16-feet compass.
Choir, CC to f^3 in alt, 54 keys, 8-feet compass.
Swell, tenor c to f^4 in altissimo, 54 keys, 4-feet compass.
Swell Bass, two octaves.
Pedal Stop, CCCC to tenor c, 37 Pipes, 32-feet compass.
Pedal Clavier, CCC to tenor c, 25 keys.

143. New York.

The Organ in the Church of the Annunciation, New York, United States, was built by George Jardine, of New York, in 1853. It contains 3 Manual Organs, of 8-feet compass, and a separate Pedal, and also 30 Sounding Stops. The following is a list of its contents:

Great, 9 Stops.

1—Double Diapason .. 16 feet.	6—Twelfth..... $2\frac{2}{3}$ feet.
2—Open Diapason.... 8 feet.	7—Fifteenth..... 2 feet.
3—Stopped Diapason .. 8 feet tone.	8—Sesquialtera, IV ranks.
4—Melodia..... 8 feet.	9—Trumpet..... 8 feet.
5—Principal..... 4 feet.	

Choir, 8 Stops.

10—Open Diapason.... 8 feet.	14—Flute..... 4 feet tone.
11—Viola di Gamba .. 8 feet.	15—Fifteenth..... 2 feet.
12—Stopped Diapason.. 8 feet tone.	16—Clarinet, Treble.... 8 feet tone.
13—Principal..... 4 feet.	17—Bassoon, Bass.... 8 feet.

Swell, 10 Stops.

18—Bourdon..... 16 feet tone.	23—Fifteenth..... 2 feet.
19—Open Diapason.... 8 feet.	24—Mixture, III ranks.
20—Stopped Diapason .. 8 feet tone.	25—Trumpet..... 8 feet.
21—Dulciana..... 8 feet.	26—Oboe..... 8 feet.
22—Principal..... 4 feet.	27—Clarion..... 4 feet.

Pedal, 3 Stops.

28—Open Diapason.... 16 feet.	30—Octave..... 8 feet.
29—Bourdon ..... 16 feet tone.	

Couplers.

1—Swell to Great.	6—Great to Pedal.
2—Swell Octave to Great.	7—Choir to Pedal.
3—Swell to Choir.	8—Swell to Pedal.
4—Choir to Great.	9—Pedal Organ Octave.
5—Choir Sub-octave to Great.	

Compass.

Great, CC to f^3 in alt.	Swell, CC to f^3 in alt.
Choir, CC to f^3 in alt.	Pedal, CCC to tenor e.

By means of Mr. G. Jardine's Pallet, the touch is relieved from all disagreeable stiffness, although there are 5 Manual Couplers, upwards and downwards as well as in the unison.

144. New York.

The Organ in the first Presbyterian Church, New York, was built by George Jardine, of that city. It has 36 Sounding Stops, 3 Manuals, and Pedal. The following is a list of the Stops:

Great, 12 Stops.

1—Double Open Diapason 16 feet.	7—Hohl-flute ..... 4 feet.
2—Open Diapason..... 8 feet.	8—Twelfth..... $2\frac{2}{3}$ feet.
3—Open Diapason..... 8 feet.	9—Fifteenth ..... 2 feet.
4—Stopped Diapason .. 8 feet tone.	10—Sesqui-altera, III ranks 2 feet.
5—Melodia (open wood) 8 feet.	11—Mixture.... III ranks 1 foot.
6—Principal ..... 4 feet.	12—Trumpet ..... 8 feet.

Choir, 9 Stops.

13—Open Diapason	8 feet.	18—Rohr-flote	4 feet tone.
14—Dulciana, through ..	8 feet.	19—Twelfth	$2\frac{2}{3}$ feet.
15—Viol d'amour	8 feet.	20—Fifteenth	2 feet.
16—Stopped Diapason ..	8 feet tone.	21—Cremona to Tenor c .	8 feet tone.
17—Principal	4 feet.		

Swell, 10 Stops.

22—Bourdon.....	16 feet tone.	27—Principal	4 feet.
23—Open Diapason	8 feet.	28—Fifteenth	2 feet.
24—Stopped Diapason ..	8 feet tone.	29—Mixture, III ranks..	2 feet.
25—Viol di Gamba	8 feet.	30—Cornopean	8 feet.
26—Vox Celestes, II ranks	8 feet.	31—Hautboy	8 feet.

Pedal, 5 Stops.

32—Open Diapason	16 feet.	35—Violoncello	8 feet.
33—Stopped Diapason ..	16 feet tone.	36—Contra Fagotto	16 feet.
34—Octave	8 feet.		

Accessory Stops.

Six Manual and Pedal Couplers.

Compass.

Great, CC to g^3 in altissimo.	Swell, CC to g^3 in altissimo.
Choir, CC to g^3 in altissimo.	Pedal, CCC to Tenor f.

A very large Organ, of which the writer has not the list of Stops, was built by Messrs. E. and G. G. Hook, for the Tremont Temple, Boston, United States, in 1854. It has 56 Stops, 4 Manuals, a Pedal with double Bourdon, 32 feet tone, and about 3,500 Pipes. It has been described by an organist, who has heard and tried it, as a most successful instrument.

A TABLE OF FOREIGN AND ENGLISH EQUIVALENT TERMS.

As many of the names which appear in the foregoing accounts of Continental Organs may not be familiar to some readers, the following table of the chief Foreign Stops, with their English equivalents, when they exist, and a brief notice of them when they do not, has been prepared; which, it is hoped, may assist those who may not be able to decipher the foreign nomenclature. After each name, one reference is given to some Organ which contains that particular Stop or term; having traced which, the reader will find little difficulty in recognising the same Stop, even if its name be somewhat differently spelt, in other Specifications.

Manual Stops.

Grosse Principal (No. 16, p. 331, Gt.)..... 32 feet.	Double Double Open Diapason..... 32 feet.
Montre (No. 19, p. 334, Gt.)..... 32 feet.	The same, "mounted," or in "front."
Sub-Bourdon (No. 16, p. 331, Gt.)..... 32 feet tone.	Double Double Stopped Diapason..... 32 feet tone.

Manual-Untersatz (No. 40, p. 349, Gt.) ..... 32 feet tone.	The same.
Bourdon, or Bordun (Nos. 51 and 64, pp. 357 and 366, Gt.) ..... 32 feet tone.	The same.
Principal (No. 57, p. 361, Gt.) ..... 16 feet.	Double Open Diapason .. 16 feet.
Montre (Nos. 13 and 13B, pp. 328 and 329, Gt.) 16 feet.	The same, "mounted," or "in front."
Prestant (No. 1, p. 315, Gt.) ..... 16 feet.	The same.
Gamba Major (No. 40, p. 349, Gt.) ..... 16 feet.	Great, or Double Gamba. 16 feet.
Salicional (No. 49, p. 356, Echo) ..... 16 feet.	Reedy Double Dulciana . 16 feet.
Bourdon, or Bordun (Nos. 2 and 23, pp. 316 and 338, Gt.) ..... 16 feet tone.	Double Stopped Diapason. 16 feet tone.
Tibia Major (No. 40, p. 349, Gt.) ..... 16 feet tone.	The same.
Gross-Gedact (No. 33, p. 344, Gt.) ..... 16 feet tone.	The same.
Leiblich Gedact (No. 63, p. 365, Cr.) ..... 16 feet tone.	Double Stopped Diapason, of slender scale and sweet intonation.
Rohr-Flote (No. 50, p. 356, Gt.) ..... 16 feet tone.	Double Stopped Diapason, of metal Pipes with chimneys.
Quintaton (No. 44, p. 354, Gt.) ..... 16 feet tone.	Double Stopped Diapason, of rather small scale, producing the Twelfth of the fundamental sound, as well as the ground-tone itself, i. e. sounding the 16 and $5\frac{1}{3}$ ft. tones. 16 feet tone.
Octave (No. 57, p. 361, Gt.) ..... 8 feet.	Octave to the "Principal" or *Double* Open Diapason of 16 feet, and therefore identical with the *Unison* Open Diapason ..... 8 feet.
Principal (No. 44, p. 352, Gt.) ..... 8 feet.	Open Diapason ..... 8 feet.
Montre (No. 12, p. 325, Gt.) ..... 8 feet.	The same.
Flute (No. 13B, p. 329, Gt.) ..... 8 feet.	The same.
Geigen Principal (No. 46, p. 354, Ec.) ..... 8 feet.	Violin or crisp-toned Diapason ..... 8 feet.
Gamba, or Viol da Gamba (Nos. 44 & 47, pp. 352 & 354, Gt.) ..... 8 feet.	Bass Viol. Unison Stop, of smaller scale and thinner but more pungent tone than the Violin Diapason ..... 8 feet.

Fugara (No. 58, p. 362, Cr.)	8 feet.	A species of small-scale Gamba, of bright and cutting tone, and slow speech	8 feet.
Salicional (No. 35, p. 344, Gt.)	8 feet.	Dulciana of Reedy quality.	8 feet.
Flauto Traverso (No. 42, p. 351, Cr.)	8 feet.	German Flute, formed of cylindrical Pipes, of Pear-tree wood, and sounding their octave in the Treble	8 feet.
Hohl-Flote (No. 25, p. 339, Gt.)	8 feet.	Hollow-Flute, a kind of Clarabella	8 feet.
Harmonica (No. 42, p. 351, Gt.)	8 feet.	A unison open wood Stop, sometimes smaller in the Treble and larger in the Bass than the Hohl-Flote	8 feet.
Spitz-Flote (No. 80, p. 382, Gt.)	8 feet.	Spire or Taper Flute, a unison open metal Stop, formed of Pipes with conical bodies	8 feet.
Gemshorn (No. 78, p. 380, Gt.)	8 feet.	Goat-Horn, a unison open metal Stop; more conical than the Spitz-Flote.	8 feet.
Coppel (No. 33, p. 344, Gt.)	8 feet.	Coupling-flute—a kind of Stopped Diapason or Clarabella, intended to be used chiefly in combination with some other Stop—as the Stopped Diapason is used with the Clarinet in England—hence its name	8 feet.
Portunal-flaut (No. 53, p. 358, Gt.)	8 feet.	An open wood Stop, of the Clarabella species, the Pipes of which are larger at top than at bottom, and producing a tone of Clarinet quality	8 feet.
Bifara (No. 39, p. 343, Gt.)	8 feet.	A unison open Stop, formed of Pipes having two mouths, the speech of which is accompanied by a pleasing undulation	8 feet.
Unda Maris (No. 96, p. 394, Gt.)	8 feet.	Wave of the Sea. A unison open Stop, tuned rather sharper than the other Stops, and producing an undulating or waving effect, when drawn in conjunction with another Stop	8 feet.
Voix-celeste (No. 12 A, p. 327, Sw.)	8 feet.	A Stop of II ranks, resembling Dulcianas, one of which is tuned sharper than the other, producing an undulating effect like that of the Unda Maris.	8 feet.

Block-flote (No. 68, p. 372, Brustwerk)	8 feet.	Common or ordinary Flute, formed of Pipes larger than Diapason scale . . .	8 feet.
Portunal (No. 94, p. 393, Gt.)	8 feet.	An open wood Stop, of the Clarabella species, but with the Pipes larger at top than at bottom, and producing a tone like that of the Clarinet	8 feet.
Flauto Dolce	8 feet.	A unison Flute-Stop, of tranquil and agreeable tone; well adapted for cantabile music, for which an Open Diapason would be both too strong and too full	8 feet.
Gedact (No. 58, p. 362, Gt.)	8 feet tone.	Covered Stop. Stopped Diapason	8 feet tone.
Lieblich Gedact (No. 60, p. 364, Ch.).....	8 feet tone.	Stopped Diapason, of slender scale and sweet intonation	8 feet tone.
Still Gedact (No. 44, p. 352, Ch.)	8 feet tone.	Stopped Diapason, of quiet tone	8 feet tone.
Rohr-Flote (No. 65, p. 367, Gt.)	8 feet tone.	Reed-Flute. Metal Stopped Diapason, with reeds, tubes, or chimneys	8 feet tone.
Quintaton (No. 46, p. 353, Gt.)	8 feet tone.	Stopped Diapason, producing the Twelfth as well as the ground-tone, i. e. sounding the 8 and $2\frac{2}{3}$ feet tones	8 feet tone.
Nacht-Horn (No. 46, p. 353, Cr.)	8 feet tone.	Night-Horn. Nearly identical with the foregoing; but of larger scale, and more horn-like in tone .	8 feet tone.
Quint (No. 2, p. 316, Gt.)	$5\frac{1}{3}$ feet.	Fifth Sounding Stop. In this case producing the Fifth above the Diapason.....	$5\frac{1}{3}$ feet.
Grosse Nazard, Nasard, Nassat, Nasat	$5\frac{1}{3}$ feet.	Fifth to the Unison Diapason	$5\frac{1}{3}$ feet.
Gemshorn-quint (No. 59, p. 363, Gt.).....	$5\frac{1}{3}$ feet.	Fifth, composed of Gemshorn Pipes	$5\frac{1}{3}$ feet.
Quint-gedact (No. 6, p. 320, Gt.)	$5\frac{1}{3}$ feet tone.	Stopped Fifth.....	$5\frac{1}{3}$ feet tone.
Roer-quint (No. 1, p. 315, Gt.)	$5\frac{1}{3}$ feet tone.	Stopped Fifth, formed of Metal Pipes with chimneys	$5\frac{1}{3}$ feet tone.
Super-octave (No. 57, p. 361, Gt.)	4 feet.	The second octave or Fifteenth above the "Principal" or Double Open Diapason of 16 feet, identical with the English Principal	4 feet.

Octave (No. 44, p. 352, Gt.)	4 feet.	The Octave to the Open Diapason of 8 feet. The English Principal	4 feet.
Principal (No. 108, p. 400, Cr.)	4 feet.	Principal	4 feet.
Prestant	4 feet.	The same	4 feet.
Spitz-flote (No. 79, p. 381, Gt.)	4 feet.	Octave Stop, formed of Conical Pipes	4 feet.
Gemshorn (No. 80, p. 382, Gt.)	4 feet.	Octave Stop, formed of more Conical Pipes	4 feet.
Geigen Principal (No. 63, p. 365, Cr.)	4 feet.	Violin Principal	4 feet.
Gambette (No. 70, p. 373, Gt.)	4 feet.	Small Gamba, or Octave Gamba	4 feet.
Salicional-octave (No. 39, p. 348, Cr.)	4 feet.	Octave Salicional	4 feet.
Flauto Traverso (No. 42, p. 351, Cr.)	4 feet.	German Flute, the Treble Pipes sounding their harmonic, or octave	4 feet.
Hohl-flote (No. 42, p. 351, Gt.)	4 feet.	A kind of octave Clarabella	4 feet.
Flaut a becq (No. 6, p. 320, Cr.)	4 feet.	Flute with beak or mouthpiece at one end. The old English Flute	4 feet.
Klein-Gedact (No. 48, p. 355, Cr.)	4 feet tone.	Small covered Stop. Stopped Flute	4 feet tone.
Rohr-Flote (No. 67, p. 370, Gt.)	4 feet tone.	Stopped Metal Flute, with reeds, tubes, or chimneys	4 feet tone.
Grosse Tierce (No. 20, p. 335, Gt.)	$3\frac{5}{7}$ feet.	Great Third-sounding Stop. In this case producing the Third above the Principal. Tenth or Decima.	$3\frac{3}{5}$ feet.
Quinte (No. 57, p. 361, Gt.)	$2\frac{2}{3}$ feet.	Fifth-sounding Stop; when of this size, producing the Fifth above the Principal. Twelfth, or Duodecimo.	$2\frac{2}{3}$ feet.
Gemshorn-quint (No. 53, p. 358, Gt.)	$2\frac{2}{3}$ feet.	Twelfth, formed of Gemshorn Pipes	$2\frac{2}{3}$ feet.
Nazard (No. 37, p. 347, Gt.)	$2\frac{2}{3}$ feet.	Twelfth	$2\frac{2}{3}$ feet.
Sedecima (No. 89, p. 389, Gt.)	2 feet.	The third octave, Octave Fifteenth, or Twenty-second, above the "Principal" or *Double* Open Diapason of 16 feet. Identical with the English "Fifteenth".	2 feet.
Super-Octave (No. 44, p. 352, Gt.)	2 feet.	The second octave above the unison "Principal." The Fifteenth	2 feet.
Octave (No. 108, p. 400, Cr.)	2 feet.	Octave to the Principal of 4 feet	2 feet.
Doublette (No. 14, p. 330, Gt.)	2 feet.	The same	2 feet.

Quarte de Nazard (No. 20, p. 335, Gt.)	2 feet.	The same.	
Quinta-decima (No. 47, p. 354, Gt.)	2 feet.	The Fifth above the Tenth; i. e. the Fifteenth	2 feet.
Gemshorn (No. 10, p. 323, Gt.)	2 feet.	Gemshorn Fifteenth	2 feet.
Wald-Flote (No. 37, p. 347, Gt.)	2 feet.	Forest-flute	2 feet.
Hohl-Flote (No. 46, p. 354, Gt.)	2 feet.	Hollow-flute, of Fifteenth pitch	2 feet.
Rausch-pfeif (No. 65, p. 367, Gt.)	$2\frac{2}{3}$ feet.	Twelfth and Fifteenth on one slider	$2\frac{2}{3}$ feet.
Rausch-quint (No. 71, p. 375, Gt.)	$2\frac{2}{3}$ feet.	The same.	
Flageolet (No. 110, p. 401, Ec.)	2 feet.	Flageolet	2 feet.
Terz (No. 82, p. 383, Gt.)	$1\frac{3}{5}$ foot.	Tierce; when of this size, sounding the Third above the Fifteenth	$1\frac{3}{5}$ foot.
Sexte (No. 49, p. 355, Gt.)	$2\frac{2}{3}$ feet.	Sixth. A II rank mutation stop, sounding the interval of a major sixth. A Twelfth and Tierce on one slider	$2\frac{2}{3}$ feet.
Sesquialtera (No. 71, p. 375, Cr.)	$2\frac{2}{3}$ feet.	Sesquialtera, II ranks; the same	$2\frac{2}{3}$ feet.
Quinta (No. 81, p. 383, Cr.)	$1\frac{1}{3}$ foot.	Fifth sounding Stop, producing the Fifth above the Fifteenth. The Nineteenth or Larigot	$1\frac{1}{3}$ foot.
Tertian	$1\frac{3}{5}$ foot.	A II rank Mutation Stop, sounding the interval of a minor third. A Tierce and Larigot on one slider	$1\frac{3}{5}$ foot.
Sedecima (No. 85, p. 386, Cr.)	1 foot.	Twenty-second or Octave Fifteenth	1 foot.
Mixture (No. 57, p. 361, Gt.)	2 feet.	A mixed Stop, i. e. consisting of Foundation and Mutation ranks of Pipes, compounded together; the largest rank being usually a Fifteenth	2 feet.
Scharf (No. 57, p. 361, Gt.)	$1\frac{1}{3}$ foot.	Sharp, also a mixed Stop, composed of smaller Pipes than the Mixture, or on a smaller scale; and sometimes containing a Tierce, particularly if the Mixture has not one	$1\frac{1}{3}$ foot.
Cymbel (No. 57, p. 361, Gt.)	1 foot.	The most acute of the bright Stops, being very small in scale, and high in pitch. It is sometimes formed exclusively of octave ranks	1 foot.

Cornet.		Cornet, frequently a Compound Stop, formed of Pipes several scales larger than Diapason measure, and producing a "horny" tone; hence its name. Sometimes the Cornet is a large Manual Reed, as at Freiburg and Seville; in other examples it is a small Pedal Reed, as at Muhlhausen, Merseburg, &c.	
Contra-fagott (No. 56, p. 360, Gt.)	32 feet.	Double Double Bassoon	32 feet.
Tromba (No. 57, p. 361, Gt.)	16 feet.	Double Trumpet	16 feet.
Tuba (No. 40, p. 349, Gt.)	16 feet.	The same.	
Trompet (No. 1, p. 315, Gt.)	16 feet.	The same.	
Dulcian (No. 2, p. 316, Gt.)	16 feet.	Dulcian means, literally, a small Bassoon. In this case, a Double Bassoon.	16 feet.
Fagotto (No. 4, p. 319, Ec.)	16 feet.	Double Bassoon	16 feet.
Bombarde (No. 14, p. 330, Gt.)	16 feet.	Double Reed	16 feet.
Euphone (No. 15B, p. 329, Gt.)	16 feet.	Double Reed	16 feet.
Phisarmonica (No. 70, p. 374, Gt.)	16 feet.	Double Reed, with Free Reeds, and Tubes of half length	16 feet tone.
Grand Cornet (No. 111, p, 402, Gt.)	16 feet.	Double Reed	16 feet.
Corneta (No. 141, p. 430, No. 18)		Double Reed	
Trompette (No. 13B, p. 329, Gt.)	8 feet.	Trumpet	8 feet.
Trompette Harmonique (No. 12, p. 328, Clavier de Bombardes)	8 feet.	Harmonic Trumpet	8 feet.
Hautbois (No. 13B, p. 329, Pos.)	8 feet.	Hautboy	8 feet.
Cor Anglais (No. 12A, p. 327, Sw.)	8 feet.	English Horn	8 feet.
Dulcian (No. 9, p. 323, Cr.)	8 feet.	Bassoon	8 feet.
Fagotto (No. 2, p. 317, Cr.)	8 feet.	The same.	
Krum-Horn (No. 33, p. 344, Cr.)	8 feet tone.	Clarinet	8 feet tone.
Crom-Horn (No. 34, p. 345, Cr.)	8 feet tone.	The same.	
Schalmay (No. 2, p. 317, Cr.)	8 feet tone.	The same.	
Vox Humana (No. 76, p. 378, Cr.)	8 feet tone.	Human Voice	8 feet tone.
Clarin (No. 79, p. 381, Gt.)	4 feet.	Clarion	4 feet.

Pedal Stops.

Sub-Principal (No. 1, p. 316)..... 32 feet.	"Under Principal," i. e. below the Pedal Diapason pitch. Double Open Bass..... 32 feet.
Gross Principal (No. 70, p. 374)..... 32 feet.	Great or Double Diapason Bass..... 32 feet.
Prestant (No. 2, p. 317).. 32 feet.	The same.
Flute ouverte (No. 12, p. 326)..... 32 feet.	The same.
Untersatz (No. 81, p. 383) 32 feet tone.	"Below position," i. e. under the Pedal unison pitch. Double Stopped Bass..... 32 feet tone.
Sub-bass (No. 50, p. 357) 32 feet tone.	"Under Bass," or Double Stopped Bass..... 32 feet tone.
Quintaton (No. 13, p. 328) 32 feet tone.	Double Stopped Bass, sounding the Twelfth as well as the ground tone; in this case producing the 32 and $10\frac{2}{3}$ feet tones.
Grand Bourdon (No. 12A, p. 327)..... 32 feet tone.	Great or Double Bourdon 32 feet tone.
Gross-Quinten-Bass (No. 64, p. 366)..... $21\frac{1}{3}$ feet tone.	Fifth to the Great Bass of 32 feet..... $21\frac{1}{3}$ feet tone.
Principal Bass (No. 80, p. 382)..... 16 feet.	Open Diapason Bass..... 16 feet.
Octave (No. 91, p. 391).. 16 feet.	The same.
Prestant (No. 2, p. 317).. 16 feet.	The same. Where there is a Metal "Principal" of 16 feet on the same Pedal, the name Prestant is applied to a *wood* Open Bass of the same size, as at Liegnitz, No. 88, p. 388.
Flute ouverte (No. 20, p. 336)..... 16 feet.	The same.
Violone (No. 42, p. 351) 16 feet.	Double Bass. A unison open wood Stop, of much smaller scale than the Diapason, and formed of Pipes that are a little wider at the top than at the bottom, and furnished with ears and beard at the mouth. The tone of the Violone is crisp, and resonant, like that of the orchestral Double Bass; and its speech being a little slow, it has the Stopped Bass always drawn with it..... 16 feet.

Gamba (No. 59, p. 363).. 16 feet.	Gamba Bass ..... 16 feet.
Salicet (No. 59, p. 363).. 16 feet.	Dulciana Bass ..... 16 feet.
Sub-Bass (No. 33, p. 344) 16 feet tone.	Stopped Bass, usually, but sometimes Open wood, 16 feet, as at Haarlem, (No. 1, p. 316) ..... 16 feet tone.
Bourdon (No. 37, p. 347) 16 feet tone.	This name is very rarely applied to a Pedal Stop. When it is so, it is generally to a Stopped Bass, though occasionally to a wood open Bass, 16 feet, as at Strasbourg (No. 36, p. 347)..... 16 feet tone.
Quintaton (No. 46, p. 354) 16 feet tone.	A small scale unison Covered Stop, sounding the Twelfth as well as the ground-tone, i. e. producing the 16 feet and $5\frac{1}{3}$ feet tones ..... 16 feet tone.
Grosse Quint, Stopped — (No. 71, p. 375) ....$10\frac{2}{3}$ feet.	Great Fifth, Stopped ....$10\frac{2}{3}$ feet tone.
Roer-quint (No. 1, p. 316) $10\frac{2}{3}$ feet tone.	Stopped Fifth, formed of Pipes with reeds, tubes, or chimneys .....$10\frac{2}{3}$ feet tone.
Octave—(No. 85, p. 387) 8 feet.	Octave, or Principal to the Diapason of 16 feet .. 8 feet.
Violoncello (No. 54, p. 359) 8 feet.	Crisp-toned Open Stop, of small scale. The "Octave" to the Violone of 16 feet..... 8 feet.
Bass-Flute..... 8 feet tone.	Flute Bass. The Stopped Octave to the Stopped Bass of 16 feet tone.. 8 feet tone.
Tertia (No. 74, p. 377) .. $6\frac{2}{5}$ feet.	Tenth, or Great Tierce ... $6\frac{2}{5}$ feet.
Quint (No. 20, p. 336).. $5\frac{1}{3}$ feet.	Twelfth ..... $5\frac{1}{3}$ feet.
Rohr-quint (No. 69, p. 373) $5\frac{1}{3}$ feet tone.	Stopped Twelfth..... $5\frac{1}{3}$ feet tone.
Super-octave (No. 25, p. 340) 4 feet.	Fifteenth ..... 4 feet.
Mixture, V ranks (No. 91, p. 391) ..... 4 feet.	Mixture, V ranks ..... 4 feet.
Cornet, VIII ranks (No. 82, p. 384)	Pedal Cornet.
Contra Posaune (No. 77, p. 379) ..... 32 feet.	Double Trombone ..... 32 feet.
Posaune (No. 77, p. 379) 16 feet.	Trombone..... 16 feet.
Bombarde (No. 13B, p. 329)	Large Unison Pedal Reed . 16 feet.
Fagotto (No. 65, p. 367).. 16 feet.	Bassoon ..... 16 feet.
Dulcian (No. 66, p. 369) . 16 feet.	Small Bassoon ..... 16 feet.
Trompet (No. 82, p. 384) 8 feet.	Trumpet ..... 8 feet.
Trombone (No. 2, p. 317) 8 feet	Large Octave Reed..... 8 feet.
Basson (No. 13 B, p. 329) 8 feet.	Octave Bassoon ..... 8 feet.
Krummhorn (No. 49, p. 356) 8 feet.	Cremona ..... 8 feet tone.

Clairon (No. 84, p. 386) .	4 feet.	Clarion	4 feet.
Cornet (No. 50, p. 357) . .	4 feet.	Cornet—a small Reed, Clarion	4 feet.
Cinq (No. 1, p. 316)	2 feet.	Octave Clarion	2 feet.
Cornet (No. 49, p. 356) . .	2 feet.	Octave Clarion	2 feet.

BRITISH ORGANS.

LONDON AND ITS ENVIRONS.

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145. Panopticon.

The largest and by far the most complete Organ in London is that in the Royal Panopticon of Science and Art, Leicester Square. It was built by Messrs. Hill & Co. in 1853. It comprises not only all the usual modern improvements, but several new inventions in mechanism; among which are an entirely new method of drawing the Stops, by Pneumatic agency; an improved system of Composition Pedals; and a Pedal for first drawing out the Stops one by one, in gradual succession, and afterwards of reducing them in a similar manner, so as to produce a perfect Crescendo and Diminuendo; desiderata which have hitherto been considered unattainable by mechanical means, except by the aid of a Swell-box.

The Organ contains 60 sounding Stops, all of which are complete or whole Stops, excepting the *Vox Angelica* in the Solo Organ, which only goes to Tenor c. It has 4 Manual Organs, all of the CC or 8-feet compass; a separate Pedal of 10 Stops; 6 Bellows, at different pressures, worked by steam power; and is furnished with duplicate Manuals to the Swell, Choir, and Solo Organs, ranged to the right and left of the chief tiers of Manuals, and acting on separate pallets in the corresponding Sound-boards. The auxiliary Manuals are designed to allow of several performers playing on the instrument at the same time, if ever thought desirable.

All the musical scales have alike been rendered available to the performer on this instrument, by the adoption of the admirable system of equal temperament.

The following is a list of the Stops in the Panopticon Organ:

Great Organ, 16 Stops.

1—Double Open Diapason, metal and wood	16 feet.	9—Super Octave . . metal	2 feet.
2—Open Diapason, metal	8 feet.	10—Sesquialtera, III ranks, metal	
3—Open Diapason, No. 2, metal	8 feet.	11—Mixture, III ranks, met.	
4—Stopped Diapason, wood	8 feet tone.	12—Furniture, III rks. met.	
5—Quint . . . . . metal	6 feet.	13—Trumpet . . . . . metal	16 feet.
6—Octave . . . . . metal	4 feet.	14—Posaune . . . . . metal	8 feet.
7—Wald Flute . . . wood	4 feet.	15—Trumpet . . . . . metal	8 feet.
8—Octave Quint . . metal	3 feet.	16—Clarion . . . . . metal	4 feet.

Choir Organ, 12 Stops.

17—Double Stopped Diapason . . . . . wood 16 feet tone.
18—Gamba . . . . . metal 8 feet.
19—Dulciana . . . . . metal 8 feet.
20—Stopped Diapason, metal and wood 8 feet tone.
21—Gemshorn . . . . metal 4 feet.
22—Octave Quint . . metal 3 feet.
23—Super Octave . . metal 2 feet.
24—Cymbal, II ranks, met.
25—Stopped Flute, metal 4 feet tone.
26—Piccolo . . . . . wood 2 feet.
27 { Bassoon, Bass . . wood / Clarionet, Treble, wood } 8 feet.
28—Trumpet . . . . metal 8 feet.

Solo Organ, 9 Stops.

29 Tuba Organ. { 1. Grand Tuba Mirabilis . . metal 8 feet.
30 Tuba Organ. { 2. Do Clarion, met. 4 feet.
31—Claribel . . . . . wood 8 feet.
32—Harmonic Flute, metal 4 feet.
33—Flageolet . . . . . metal 2 feet.
34—Doublette, II ranks . . metal 2 feet.
35—Vox Angelica, II rks. metal 8 feet.
36—Krum Horn . . . metal 8 feet tone.
37—Vox Humana . . metal 8 feet tone.

Swell Organ, 13 Stops.

38—Bourdon and Double Diapason, wood and metal . . . . . 16 feet.
39—Open Diapason, metal 8 feet.
40—Salcional . . . . . metal 8 feet.
41—Stopped Diapason, wood 8 feet.
42—Octave . . . . . metal 4 feet.
43—Octave Quint . . metal 3 feet.
44—Super Octave . . metal 2 feet.
45—Sesquialtera, V & IV ranks . . . . . metal
46—Suabe Flute . . . wood 4 feet.
47—Cornopean . . . . metal 8 feet.
48—Trumpet . . . . . metal 8 feet.
49—Hautboy . . . . . metal 8 feet.
50—Clarion . . . . . metal 4 feet.

Pedal Organ, 10 Stops.

51—Double Open Diapason . . . . . wood 32 feet.
52—Open Diapason, wood 16 feet.
53—Open Diapason, metal 16 feet.
54—Bourdon . . . . . wood 16 feet tone.
55—Octave . . . . . metal 8 feet.
56—Octave Quint . . metal 6 feet.
57—Super Octave . . metal 4 feet.
58—Sesquialtera, V ranks, metal 3 feet.
59—Trombone . . . . metal 16 feet.
60—Octave Trombone, met. 8 feet.
61—Drums CC—C.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Choir to Great.
3—Solo to Great.
4—Pedal to Great.
5—Pedal to Choir.
6—Pedal to Swell.
7—Pedal to Solo.
8 to 16—Nine Composition Pedals.
17, 18—Two Tremulants.
19—Pneumatic Lever attachment.
20—Crescendo and Diminuendo Pedal.

Number of Sounding Stops.		Number of Pipes.	
Great Organ	16	Great Organ	1276
Choir	12	Choir	754
Swell	13	Swell	932
Solo	9	Solo	626
Pedal	10	Pedal	416
	60	Total	4004

146. St. Paul's Cathedral.

The Organ in St. Paul's Cathedral was built by Father Smith in 1697. It originally consisted of a "Great and Chair Organ," the former ranging from CCC (16 feet compass) to c^3 in alt; the latter descending to FFF (the 12 feet compass). Towards the latter part of the last century, a Swell of Seven Stops, to Tenor c (4 feet compass) was added by Crang; but being the first made by that builder, it proved less successful than that subsequently added by him to the Organ at St. Clement Danes. At the beginning of the present century, the pitch of the Organ, which had till then been very high, was lowered, by the whole of the Pipes being transposed upwards a semitone, and an entirely new series of Pipes introduced for the CCC key. This change was effected by the Messrs. Orchman and Nutt. In 1826, considerable alterations were made in the instrument by the late Mr. Bishop, who extended the Manuals up to f^3 in alt; introduced a Clarion into the Great Organ in place of the Nason; put in a Clarabella in lieu of the Stopped Diapason Treble; placed a second Trumpet Treble on the Cornet slider; and also put new Trebles to the Chorus Stops. In the Choir Organ, he substituted a Dulciana and an Open Diapason for the Vox Humana and III rank Mixture; and added an octave of large Pedal Pipes, as well as Horizontal Bellows in place of the 4 Diagonal Bellows, 8 feet by 4, by which the Organ had previously been supplied. He also first introduced the Concussion Bellows into this Organ at this period. In 1849, Mr. Bishop put in a new Swell to Gamut G ($5\frac{1}{3}$ feet compass), the available room within the Case unfortunately neither allowing of the adoption of the more complete compass, nor of the introduction of any Double Stops. At the same time he substituted a Viol da Gamba for the Metal Flute in the Choir Organ, and a Clarabella for the Stopped Diapason; and also put in new Keys and Pedals. The following is a list of the Stops at St. Paul's:

Great, 13 Stops, CCC or 16 feet compass.

1—West Front Open Diapason.
2—East Front Open Diapason.
3—Stopped Diapason, Clarabella Treble.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Block Flute, labelled large Fifteenth.
8—Tierce.
9—Sesquialtera, II ranks.
10—Mixture..... II ranks.
11—Trumpet.
12—Trumpet to middle c^1, in place of Cornet.
13—Clarion.

Choir, in front, 8 Stops, FFF or 12 feet compass.

14—Open Diapason.
15—Stopped Diapason.
16—Dulciana.
17—Viol di Gamba.
18—Principal.
19—Twelfth.
20—Fifteenth.
21—Cremona to Tenor c.

Swell, 7 Stops, Gamut G or $5\frac{1}{3}$ feet compass.

22—Open Diapason.
23—Stopped Diapason.
24—Principal.
25—Sesquialtera, III ranks.
26—French Horn.
27—Hautboy.
28—Trumpet.

Pedal, CCC or 16 feet compass.

29—One Octave of Open Wood Pipes to CCC,—16 feet length.

Accessory Stops, Movements, &c.

1—Great to Pedal.
2—Choir to Pedal.
3—Swell to Great.
4—Swell to Choir.
5, 6, 7, 8—Four Composition Pedals.

Compass.

Great, CCC to f^3 in alt.
Choir, FFF to f^3 in alt.
Swell, Gamut G to f^3 in alt.
Pedal, CCC to Tenor c.

147. Westminster Abbey.

The present Organ in Westminster Abbey was originally built, in 1730, by Schreider and Jordan. It then consisted of Great and Choir, ranging from GG ($10\frac{2}{3}$ feet compass), up to d^3 in Alt, and a Swell with 4 Unison Stops to Fiddle g ($2\frac{2}{3}$ feet compass). A Pedal-board from GG to Gamut A, with an octave of Unison Open Pipes, were added by Avery during the time Dr. Cooke was Organist. In 1828, an Octave of GGG Pedal Pipes, and a new (soft) Trumpet and Clarion, in place of the old Reeds, were introduced by Elliott. Subsequently a new Swell to Tenor c, with 8 Stops, was added by Hill; and a Dulciana and Open Diapason put into the Choir Organ in place of the Fifteenth and Cremona. In 1848, the Organ was entirely reconstructed by Mr. Hill, and divided; the Great Organ, with new and larger sound-boards, movements, &c. being placed on the south side of the screen, and the Swell on the North; leaving the centre unoccupied, so that an uninterrupted view of the upper part of the Minster may be obtained from one end to the other. The Choir Organ remains in its old place over the doorway leading from the Nave into the Choir, and the 32-feet Pedal Diapasons are laid horizontally along the screen. The Claviers are placed, crossways, behind the Choir Organ.

The alterations in 1848 comprised an extension of the Great Organ down to CCC (the 16-feet compass), with the addition of a new Open Diapason; the conversion of one of the old Diapasons into a Double; the insertion of a Quint; a Posaune, and III additional ranks of Mixture. The compass was also extended up to f^3 in alt. An entirely new Swell to CC (8-feet compass) was introduced; a Hohl Flute and Cromorne added to the Choir, and two Open Diapasons, 16 and 32 feet, appropriated to the Pedal;—such of the old Pedal Pipes as were available being used in the latter.

The Organ now contains 32 Sounding Stops, of which the following is a list:

Great CCC (16 feet compass), 14 Stops.

1—Double Diapason, to CC key.
2—Open Diapason, through.
3—Open Diapason to CC.
4—Stopped Diapason.
5—Quint, to CC key.
6—Principal, through.
7—Stopped Flute to CC key.
8—Twelfth.
9—Fifteenth.
10—Sesquialtera, V ranks.
11—Mixture....III ranks.
12—Double Trumpet to Tenor c key.
13—Posaune, through.
14—Clarion.

Swell, CC (8 feet compass), 10 Stops.

15—Double Diapason.
16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Fifteenth.
20—Sesquialtera, III ranks.
21—Contra Fagotto, to Tenor c key.
22—Cornopean.
23—Hautboy.
24—Clarion.

Choir, GG ($10\frac{2}{3}$ feet compass), 6 Stops.

25—Open Diapason to Gamut G.
26—Hohl Flute.
27—Stopped Diapason.
28—Principal.
29—Flute.
30—Cromorne.

Pedal, CCC (16 feet compass), 2 Stops.

31—Great Open Diapason, 32 feet.
32—Open Diapason, 16 feet.

Accessory Stops, Movements, &c.

1—Coupler Swell to Great.
2—Great to Pedal, 16-feet pitch.
3—Great to Pedal, 8-feet pitch.
4—Choir to Pedal, 16-feet pitch.
5—Swell to Pedal, 8-feet pitch.
6, 7, 8—Three Composition Pedals.

148. Buckingham Palace.

The Organ in the Chapel at Buckingham Palace is on the left side of the altar, about nine feet from the floor; the keys are so placed that the organist sits beneath it, and no apparent connection exists between them and the instrument. The bellows are beneath the Chapel. The Organ contains the following 8 Stops:

Manual, 8 Stops.

1—Open Diapason.
2—Dulciana.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Trumpets.

Compass, GG to f^3 in alt.

149. Buckingham Palace.

His Royal Highness the Prince Albert's Organ.

This instrument was built by Messrs. Gray and Davison, in 1841, for His Royal Highness. It stands in a handsome room, in the Prince's private apartments, in the left wing of the Palace; it is divided, and in appearance resembles two beautiful cabinets, standing on each side of the fire-place, at one end of the room. There is no apparent communication between the two parts, the connection being ingeniously contrived behind the pier glass, over the fire-place. The bellows is not in the room, but is placed in an adjoining passage, where it appears like a table. The Organ contains the following 7 Sounding Stops:

Manual, 6 Stops.

1—Open Diapason.
2—Dulciana.
3—Stopped Diapason.
4—Principal.
5—Fifteenth.
6—Hautboy
Enclosed in a Swell Box.

Pedal, 1 Stop—Bourdon, 16 feet tone.

Compass.	Accessory Stops.
Manual to CC.	1, 2, 3, 4, Four Composition Pedals.
Pedal to CCC.	

150. Temple Church.

The fine Organ in the Temple Church was built by Father Smith, in 1687. It presents a great peculiarity in regard to the number of sounds which it contains in the octave. Most Organs have only twelve in that compass, but this has fourteen: that is, in addition to the common number of semitones, it possesses an "A flat" and a "D sharp," quite distinct from the notes G sharp and E flat. The general temperament of the instrument is the same as that of most English instruments —unequal;—but the real beauty of the quarter tones is discoverable by playing in the key of E and A flat, where, in consequence of the thirds being so true, we have that perfection that cannot be met with in common Organs. It gives a peculiar brilliancy also to the key of A and E in three or four sharps*. These quarter tones are produced by the ordinary G sharp and E flat keys being divided, crossways, in the middle; the back halves of which rise as much above the front portions, as do the latter above the naturals.

The memorable trial which took place between Smith and Harris, when the Organ was built, has been duly described in the "Historical Introduction." It only remains therefore to enter into matters of detail here. Originally the Temple Organ consisted of Great and Choir Organs, ranging from FFF (12 feet) to d^3 in alt,—omitting FFF♯, GG♯, AA♭, and DD♯ in the Bass;—and an Echo to Middle c^1; the whole being supplied with wind from three diagonal bellows. About the middle of the last century, Byfield added a Swell of 6 Stops to Fiddle g; the Horn going to Tenor f. In 1843, on the occasion of the complete restoration of the Church, the Organ was, by the late Mr. Bishop, placed in a spacious Organ-chamber, built expressly for its reception; and was re-erected on a new building-frame; the sound-boards were new palleted, where necessary; a Dulciana was added to the Choir Organ in place of the Vox Humana; the swell was continued down as far as Tenor c, and the quarter tones added; the DD sharp was introduced into the Great and Choir Organs; the compass of their Manuals extended upwards from d^3 to f^3 in alt; an octave and a half of FFF Pedals were laid down, and an octave of CCC return Pedal Pipes applied to them; two Pedal Couplers, and one Manual Coupler, Swell to Great, were also added, and three Composition Pedals.

Subsequently the FFF Pedals were removed, and a Pedal Clavier of the proper range—CCC to Tenor f—supplied by Robson, together with three independent Pedal Stops, as well as preparation being made for a fourth; the necessary Coupling movements also were introduced for uniting "Manuals to Pedal" correctly. The old Manuals, with black naturals and white short keys, were at the same time removed, and new ones applied.

The Organ contains 26 Sounding Stops, of which the following is a list:

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* Christian Remembrancer, vol. xv, 1833, p. 623.

Great, 10 Stops.

1—Open Diapason	8 feet.	5—Twelfth.....	$2\frac{2}{3}$ feet.
2—Stopped Diapason, metal to Tenor c, oak to the bottom	8 feet tone.	6—Fifteenth	2 feet.
		7—Sesquialtera, III rks.	$1\frac{2}{3}$ foot.
		8—Mixture,....III rks.	1 foot.
3—Principal.....	4 feet.	9—Cornet,.....IV rks.	4 feet.
4—Nason, oak throughout	4 feet tone.	10—Trumpet.....	8 feet.

Choir, 6 Stops.

11—Stopped Diapason, oak throughout	8 feet tone.	14—Spitzflute Principal ..	4 feet.
		15—Stopped Flute, metal throughout	4 feet tone.
12—Dulciana to Gamut G.	8 feet.		
13—Gamba to CC	8 feet.	16—Gemshorn Fifteenth ..	2 feet.

Swell, 7 Stops.

17—Open Diapason.....	8 feet.	20—Cornet..III ranks ..	$2\frac{2}{3}$ feet.
18—Stopped Diapason,metal to Fiddle g, new Pipes below of deal	8 feet tone.	21—Horn.....	8 feet.
		22—Hautboy.....	8 feet.
		23—Clarion.....	4 feet.
19—Principal	4 feet.		

Pedal, 3 Stops.

24—Double Stopped Bass to FFFF.....	32 feet tone.	26—Stopped Bass	16 feet tone.
		27—Preparation for Trombone	16 feet.
25—Open Bass	16 feet.		

Compass.

Great, FFF to f^3 in alt.	Swell, Tenor c to f^3 in alt.
Choir, FFF to f^3 in alt.	Pedal, CCC to Tenor f.

Accessory Stops, Movements, &c.

1—Coupler Great to Pedal.	5—Pedal Register..... 8 feet.
2—Coupler Choir to Pedal.	6—Pedal Register..... 16 feet.
3—Coupler Swell to Great.	7, 8, 9—Three Composition Pedals.
4—Coupler Choir Sub-octave to Great.	10—Tremulant Swell.

"Smith's diapasons have ever been celebrated. Those in this Organ are very excellent, particularly the Bass of the Open Diapason. The Stopped Diapason in the Great Organ is made of metal to c in the Tenor, and is a most delightful Solo Stop. The Stopped Diapason and Flute in the Choir are both excellent as Solo Stops. The Open Diapason and Stopped Diapason in the Swell, both of metal, are purity itself; and the Reed Stops are excellent, both as Solo and Chorus Stops.*"

151. Christ Church, Newgate Street.

The fine Organ in Christ Church, Newgate Street, was originally built by Harris, in 1690. After receiving various additions, it was entirely remodelled by Mr. Hill, about the year 1835, when all the Manual Organs were reconstructed to the CC

* Christian Remembrancer for 1833, p. 624.

compass. The instrument now justly ranks as one of the largest and finest in London, and contains the following Stops:

Great, 13 Stops.

1—Double Open Diapason 16 feet.	8—Sesquialtera. V ranks 2 feet.
2—Open Diapason .... 8 feet.	9—Mixture ... V ranks $1\frac{3}{5}$ foot.
3—Open Diapason .... 8 feet.	10—Doublette .. II ranks 2 feet.
4—Stopped Diapason... 8 feet tone.	11—Double Trumpet.... 16 feet.
5—Principal ..... 4 feet.	12—Posaune..... 8 feet.
6—Twelfth ..... $2\frac{2}{3}$ feet.	13—Clarion ..... 4 feet.
7—Fifteenth ..... 2 feet.	

Swell, 11 Stops.

14—Double Diapason.... 16 feet.	20—Mixture ..V ranks.. $1\frac{3}{5}$ foot.
15—Open Diapason..... 8 feet.	21—Horn ..... 8 feet.
16—Stopped Diapason .. 8 feet tone.	22—Trumpet ..... 8 feet.
17—Principal ..... 4 feet.	23—Oboe ..... 8 feet.
18—Flageolet ..... 4 feet.	24—Clarion ..... 4 feet.
19—Fifteenth ..... 2 feet.	

Choir, 5 Stops.

25—Open Diapason .... 8 feet.	28—Stopped Flute ..... 4 feet tone.
26—Stopped Diapason .. 8 feet tone.	29—Fifteenth ..... 2 feet.
27—Principal ..... 4 feet.	

Pedal, 10 Stops.

30—Great wood Diapason. 16 feet.	35—Fifteenth..... 4 feet.
31—Wood open Diapason. 16 feet.	36—Sesquialtera, VI ranks.
32—Metal open Diapason. 16 feet.	37—Mixture.... V ranks.
33—Principal ..... 8 feet.	38—Posaune..... 16 feet.
34—Twelfth ..... $5\frac{1}{3}$ feet.	39—Clarion..... 8 feet.

Accessory Stops, Movements, &c.

1 to 8—Eight Couplers.	9—Shifting Movement to Swell.

Compass.

Great, CC to f^3 in alt.	Pedal Organ, CCC to CC, one octave.
Swell, CC to f^3 in alt.	Pedal Clavier, CCC to Fiddle g, two
Choir, CC to f^3 in alt.	octaves and a half.

152. St. Sepulchre's.

The Organ in St. Sepulchre's Church, Snowhill, was originally built by Renatus Harris, in 1670, and is supposed to be the oldest instrument of his make now existing in London. It consisted, at first, of a Great and Choir Organ only; the compass being from GG, short octaves, to d^3 in alt. On the instrument undergoing an extensive repair by the elder Byfield, about the year 1730, a small Tenor f swell was added; and a new Trumpet, Clarion, and Open Diapason Bass put to the Great Organ. In 1817, the Compass was carried up to e^3 in alt, and made "long octaves" in the Bass, by Mr. Hancock; another Open Diapason was added throughout the Great Organ; a Dulciana put in the Choir Organ, in place of the Vox Humana; and an octave of GG Pedals and Unison Pedal Pipes applied. In 1827, the Swell was extended in compass down to Gamut G, by Mr. Gray, and two octaves of CCC Pedals laid down; also two Couplers, Great and Choir to Pedal, introduced. In 1835, Mr. Gray made a further extension of the Swell, and added the Great Pedal Diapason, which is the identical one that was used in the Organ erected for the Fes-

tival in Westminster Abbey, in 1834. A new sound-board was also made to the Great Organ, for facilitating the tuning, and for improving and preserving the instrument. The Organ has recently been considerably enlarged and improved by Gray and Davison, through the liberality of the parish and the munificence of a private gentleman. The new work consists of an independent Pedal Organ of 10 Stops; the Keraulophon and Clarinet Stops in the Choir Organ; an extension of the Swell Double Diapason; new Manuals, &c.; and "it now requires only a Double Diapason and new Open Diapason in the Great Organ, the Double Diapason in the Swell to be completed, and a Contra Fagotto or Double Reed throughout the same Manual, with new Draw-Stop Action, Composition Pedals, &c. to make this truly magnificent instrument complete."* It contains 41 Sounding Stops, of which the following is a list:

Great Organ, 15 Stops.

1—Open Diapason, No. 1.	8 feet.	9—Tierce	$1\frac{3}{5}$ foot.
2—Open Diapason, No. 2.	8 feet.	10—Larigot	$1\frac{1}{3}$ foot.
3—Stopped Diapason . . .	8 feet.	11—Sesquialtera, III ranks	$1\frac{1}{3}$ foot.
4—Clarabella Treble . . .	8 feet.	12—Mixture . . . . II ranks	$\frac{2}{3}$ foot.
5—Principal, No. 1	4 feet.	13—Furniture . . III ranks	$1\frac{3}{5}$ foot.
6—Principal, No. 2	4 feet.	14—Trumpet	8 feet.
7—Twelfth	3 feet.	15—Clarion	4 feet.
8—Fifteenth	2 feet.		

Swell Organ, 10 Stops.

16—Double Diapason, Bass	16 feet.	21—Sesquialtera, III ranks	$1\frac{1}{3}$ foot
17—Open Diapason	8 feet.	22—Horn	8 feet.
18—Stopped Diapason . .	8 feet.	23—Trumpet	8 feet.
19—Principal	4 feet.	24—Hautboy	8 feet.
20—Fifteenth	2 feet.	25—Clarion	4 feet.

Choir Organ, 7 Stops.

26—Stopped Diapason . .	8 feet.	30—Flute	4 feet.
27—Dulciana	8 feet.	31—Fifteenth	2 feet.
28—Keraulophon	8 feet.	32—Clarionet	8 feet.
29—Principal	4 feet.		

Pedal Organ, 10 Stops.

33—Grand Open Diapason, wood	16 feet.	38—Grand Fifteenth	4 feet.
		39—Grand Mixture, V ranks.	
34—Grand Violon, metal .	16 feet.	40—Grand Posaune	16 feet.
35—Grand Bourdon	16 feet.	41—Grand Trumpet	8 feet.
36—Grand Principal	8 feet.	42—Grand Clarion	4 feet.
37—Grand Twelfth	6 feet.		

Accessory Stops, Movements, &c.

1—Coupler, Great to Pedal, 16 ft. pitch.	7—Choir, Sub-octave to Great.
2—Coupler, Great to Pedal, 8 ft. pitch.	8—Sforzando Coupler, Great to Swell.
3—Coupler, Choir to Pedal, 8 ft. pitch.	9 to 15—Seven Composition Pedals.
4—Coupler, Swell to Pedal, 16 ft. pitch.	16—Pneumatic Lever attachment.
5—Coupler, Swell to Great.	17—Tremulant Swell.
6—Coupler, Swell to Choir.	Two Horizontal Bellows.

Compass.

Great, GG to e^3 in alt.	Swell, GG to e^3 in alt.
Choir, GG to e^3 in alt.	Pedal, CCC to Tenor f.

* Advertisement to Mr. Cooper's "Organist's Manual."

153. St. Andrew's, Holborn.

The Organ in St. Andrew's, Holborn, was originally built by Renatus Harris, in 1699, and consisted of Great and Choir Organs, comprising 22 Stops. A Swell of 8 Stops to Fiddle g was afterwards added by Byfield. A new inside was put to the instrument, soon after the commencement of the present century, by Russell; and, in 1841, the whole was entirely remodelled, revoiced, and a new Swell added, by Hill. The Organ now contains 27 Stops, of which the following is a list:

Great, 10 Stops.

1—Double Open Diapason	16 feet.	5—Twelfth	$2\frac{2}{3}$ feet.
2—Open Diapason	8 feet.	6—Fifteenth	2 feet.
3—Clarabella Treble and Stopped Diapason Bass	8 feet.	7—Sesquialtera, III rks.	$1\frac{3}{5}$ foot.
		8—Mixture .... II rks.	$\frac{2}{3}$ foot.
		9—Trumpet	8 feet.
4—Principal	4 feet.	10—Clarion	4 feet.

Choir, 6 Stops.

11—Open Diapason to Gamut G	8 feet.	14—Flute	4 feet tone.
		15—Fifteenth	2 feet.
12—Stopped Diapason ..	8 feet tone.	16—Cremona to Tenor c.	8 feet tone.
13—Principal	4 feet.		

Swell, 10 Stops.

17—Double Dulciana ...	16 feet.	22—Doublette, II ranks..	2 feet.
18—Open Diapason	8 feet.	23—Hautboy	8 feet.
19—Stopped Diapason ..	8 feet tone.	24—Trumpet	8 feet.
20—Principal	4 feet.	25—Cornopean	8 feet.
21—Flageolet	4 feet.	26—Clarion	4 feet.

Pedal, 1 Stop.

27—Open Diapason (CCC to Gamut G) ..16 feet length.

Accessory Stops, Movements, &c.

1—Coupler, Great to Pedal.	3, 4, 5—Three Composition Pedals.
2—Coupler, Swell to Great.	

Couplers.

Great and Choir, GG to f^3 in alt.	Pedal Clavier, two octaves.
Swell, Tenor c to f^3 in alt.	

154. St. Peter's, Cornhill.

The Organ in St. Peter's Church, Cornhill, was originally built by Father Smith, in 1681, at a cost of £210, inclusive of painting and gilding. It then contained the following 13 Stops; compass, GG, short octaves, to d in alt; viz.

Great, 9 Stops.

1—Open Diapason.	6—Sesquialtera. . .III ranks.
2—Stopped Diapason.	7—Mixture..... II ranks.
3—Principal.	8—Trumpet.
4—Twelfth.	9—Cornet to Middle $c^1\sharp$, V ranks.
5—Fifteenth.	

Choir, 4 Stops.

10—Stopped Diapason	12—Fifteenth.
11—Principal.	13—Cremona.

To which Crang added a Tenor f Swell of 6 Stops. The "Chorus" of Smith's Organ was originally a very fine one, but had been in bad hands. A new inside was put to the Organ, and the Case widened, by the insertion of a centre tower, by Mr. Hill, about the year 1840. On removing the old instrument, it was found to contain many wooden Pipes of Smith's construction, which the mellowing hand of time had rendered of more than ordinary value; which were accordingly incorporated with the new work. The present Organ, which is considered one of the finest in London, contains the following Stops:

Great, 20 Draw Stops.

1—Tenoroon Diapason, to Tenor c key	16 feet.	9—Wald Flute	4 feet.
2—Bourdon, to meet No. 1.	16 feet tone.	10—Oboe Flute	4 feet.
3—Principal Diapason	8 feet.	11—Stopped Flute	4 feet tone
4—Stopped Diapason, Treble	8 feet tone.	12—Twelfth	$2\frac{2}{3}$ feet.
5—Stopped Diapason, Bass	8 feet tone.	13—Fifteenth	2 feet.
6—Dulciana, to Tenor c.	8 feet.	14—Tierce	$1\frac{3}{5}$ foot.
7—Claribel Flute, to Tenor c	8 feet.	15—Sesquialtera, II ranks	$1\frac{1}{3}$ foot.
8—Principal Octave	4 feet.	16—Mixture II ranks	$\frac{2}{3}$ foot.
		17—Doublette II ranks	2 feet.
		18—Corno Trombone	8 feet.
		19—Corno Clarion	4 feet.
		20—Cremorne, to Tenor c	8 feet tone.

Swell, 18 Draw Stops.

21—Tenoroon Dulciana, to Tenor c key	16 feet.	29—Twelfth	$2\frac{2}{3}$ feet.
22—Bourdon, to meet No. 21	16 feet tone.	30—Fifteenth	2 feet.
23—Principal Diapason	8 feet.	31—Piccolo, to Tenor c	2 feet.
24—Stopped Diapason, Treble	8 feet tone.	32—Sesquialtera, III rks.	$1\frac{3}{5}$ foot.
25—Stopped Diapason, Bass	8 feet tone.	33—Mixture II rks.	$\frac{2}{3}$ foot.
26—Principal Octave	4 feet.	34—Echo Dulciana Cornet, V ranks.	
27—Suabe Flute, to Tenor c	4 feet.	35—Cornopean	8 feet.
28—Flageolet, to Tenor c	4 feet.	36—Tromba	8 feet.
		37—Hautboy	8 feet.
		38—Clarion	4 feet.

Pedal, 2 Draw Stops.

39—Great Diapason	16 feet.	40—Contra Posaune	16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	4—Octave Pedal.
2—Coupler, Great to Pedal.	5, 6, 7, 8—Four Composition Pedals.
3—Coupler, Swell to Pedal.	

Compass.

Great Organ, CC to f^3 in alt, 54 notes.	Pedal Organ, CCC to BB, 12 notes.
Swell Organ, CC to f^3 in alt, 54 notes.	Pedal Clavier, CCC to Tenor a, 27 keys.

155. St. Michael's, Cornhill.

The Organ in St. Michael's Church, Cornhill, was originally built by Renatus Harris, A.D. 1684. In the year 1789, a Swell was added, and other improvements made, by Green; and, in 1849, the Organ was entirely reconstructed by

Messrs. Robson, under the direction of Mr. Limpus, the present Organist, and now ranks as one of the finest instruments in the metropolis.

Great Organ, 12 Stops.

	Feet.	Pipes.		Feet.	Pipes.
1—Double Open Diapason, metal	16	56	7—Twelfth	3	56
2—Large Open Diapason	8	56	8—Fifteenth	2	56
3—Open Diapason	8	56	9—Sesquialtera, IV ranks.	2	224
4—Stopped Diapason	8	56	10—Mixture IV ranks.	1	224
5—Principal	4	56	11—Trumpet	8	56
6—Wald Flute	4	56	12—Clarion	4	56
					1008

Choir Organ, 8 Stops.

	Feet.	Pipes.		Feet.	Pipes.
13—Dulciana	8	56	18—Fifteenth	2	56
14—Viol di Gamba	8	44	19—Bassoon	8	56
15—Stopped Diapason	8 tone.	56	20—Clarionet	8 tone.	44
16—Principal	4	56			
17—Flute, metal	4 tone.	56			424

Swell Organ, 12 Stops.

	Feet.	Pipes.		Feet.	Pipes.
21—Double Diapason	16 tone.	56	28—Sesquialtera, III ranks.	$1\frac{3}{5}$	168
22—Open Diapason	8	56	29—Mixture II ranks.	$\frac{2}{3}$	112
23—Dulciana	8	54	30—Oboe	8	56
24—Stopped Diapason	8 tone.	56	31—Horn	8	56
25—Principal	4	56	32—Clarion	4	85
26—Fifteenth	2	56			
27—Piccolo	2	56			828

Pedal, 3 Stops.

	Feet.	Pipes.		Feet.	Pipes.
33—Open Diapason	16	30	35—Trombone, metal	16	30
34—Stopped Diapason	16 tone.	30			

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Swell to Choir.
3—Great to Pedal.
4—Choir to Pedal.
5—Swell to Pedal.
6—Octave Pedal.
7, 8, 9, 10—Four Composition Pedals.

Compass.

All the Manuals, CC to g^3 in altissimo. | Pedal, CCC to Tenor f.

Summary of Stops.

	Stops.	Pipes.		Stops.	Pipes.
Great Organ	12	1008	Pedal Organ	3	90
Swell Organ	12	828	Copulas	6	
Choir Organ	8	424			
				41	2350

156. St. Stephen's, Walbrook.

The Organ in St. Stephen's Church, Walbrook, was built by George England, about the year 1760; and was paid for out of funds raised by subscription. The quality of tone of the instrument is very good throughout. The touch, however, is disagreeable. England's Organs, like Schmidt's, were always remarkable for the brightness and brilliancy of their Chorus. This was one of the distinguishing attributes of the Organ under consideration,—esteemed the best of England's make in London;—consequently, when the Organ was repaired, in 1825, by Mr. Gray, a second Open Diapason was added to the Great Organ, on the Cornet slider, and an octave of Unison Pedal Pipes introduced, which additions considerably enriched the Chorus of the Great Organ. The Organ now contains 26 Stops, of which the following is a list:

Great, 11 Stops.

1—Open Diapason
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Nason.
6—Twelfth.
7—Fifteenth.
8—Furniture, III ranks.
9—Mixture,.. II ranks.
10—Trumpet.
11—Clarion.

Choir, 6 Stops.

12—Stopped Diapason.
13—Principal.
14—Flute.
15—Fifteenth.
16—French Horn.
17—Vox Humana.

Swell, 8 Stops.

18—Open Diapason.
19—Stopped Diapason.
20—Principal.
21—German Flute.
22—Cornet, III ranks.
23—Hautboy.
24—Trumpet.
25—Clarion.

Pedal, 1 Stop.

26—Open Pipes GG to Gamut G, one octave,..$10\frac{2}{3}$ feet length.

Compass.

1—Great, GG to e^3 in alt.
2—Choir, GG to e^3 in alt.
3—Swell, Fiddle g to e^3 in alt.
4—Pedal Stop, one octave.
5—Pedal Clavier, GG to Tenor c, octave and a half.

Accessory Stop.

Coupler Great to Pedal.

157. St. Edmund the King, Lombard Steeet.

The Organ in the Church of St. Edmund the King, Lombard Street, said to have been originally built by Harris, was entirely reconstructed by Bishop, in 1833. It is the first instrument that had a Swell descending so low as EE; the deepest compass previously adopted being to FF, in Green's Organ at Greenwich. The following is a list of the Stops in the above-named instrument:

Great, 7 Stops.

1—Open Diapason.
2—Stopped Diapason, Clarabella Treble
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera, III ranks.
7—Trumpet.

Choir, 5 Stops.

8—Dulciana to FF.
9—Stopped Diapason.
10—Principal.
11—Flute.
12—Cremona to Tenor e.

Swell, 7 Stops.

13—Open Diapson
14—Stopped Diapason
15—Principal.
16—Twelfth.
17—Fifteenth.
18—Hautboy.
19—Trumpet.

Pedal, 1 Stop.

20—Open Wood Pipes, GGG to CC,..21⅓ feet length.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Swell to Choir.
3—Coupler, Choir to Great.
4—Coupler, Great to Pedal.
5—Coupler, Choir to Pedal.
6, 7, 8, 9—Four Composition Pedals.
10—Shifting Movement to Swell.

Compass.

Great GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, EE to f^3 in alt.
Pedal, GG to Tenor c.

This Organ has a *fourth* Manual, which acts either on the Pedal Pipes, or on the Great or Choir Organs.

158. St. Mary-at-Hill.

The Organ at St. Mary-at-Hill is a very fine instrument, and was built in 1849, by Messrs. Hill and Co. It contains 30 Sounding Stops, distributed among 2 Manuals and Pedal, in the following manner:

Great, 15 Stops.—Every Stop throughout.

1—Bourdon and Open Diapason	16 feet.	8—Super Octave	2 feet.
2—Open Diapason	8 feet.	9—Walde Flute	4 feet.
3—Gamba	8 feet.	10—Flageolet	2 feet.
4—Stopped Diapason	8 feet.	11—Sesquialtera	III ranks.
5—Quint	6 feet.	12—Mixture	III ranks.
6—Octave	4 feet.	13—Posaune	8 feet.
7—Octave, Quint	3 feet.	14—Clarion	4 feet.
		15—Krum Horn	8 feet.

Swell 12 Stops.

16—Bourdon and Open Diapason	16 feet.	21—Suabe Flute	4 feet.
17—Open Diapason	8 feet.	22—Octave Quint	3 feet.
18 { Stopped Diapason, bass / Stopped Diapason, treble }	8 feet.	23—Super Octave	2 feet.
		24—Sesquialtera	3 ranks.
		25—Cornopean	8 feet.
19—Hohl Flute	8 feet.	26—Hautboy	8 feet.
20—Octave	4 feet.	27—Clarion	4 feet.

Pedal, 3 Stops.

28—Open Diapason	16 feet.	30—Trombone.	
29—Octave	8 feet.		

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Swell to Pedal.
4, 5, 6—Three Composition Pedals.

Compass.

Great, CC to f^3 in alt.
Swell, CC to f^3 in alt.
Pedal, CCC to Tenor e.

159. St. Stephen, Coleman Street.

The Church of St. Stephen, Coleman Street, contains a very good Organ, built by Avery, in the year 1775. It has 21 sounding Stops, of which the following is a list:

Great, 10 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth
6—Sesquialtera, III ranks.
7—Mixture.... II ranks.
8—Trumpet.
9—Clarion.
10—Cornet to middle c^1, V ranks.
These Stops are all throughout, except the Cornet.

Choir, 5 Stops.

11—Stopped Diapason.
12—Principal.
13—Flute.
14—Fifteenth.
15—Cremona to Tenor c.

Swell, 6 Stops.

16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Cornet III ranks.
20—Trumpet.
21—Hautboy.

Compass.

Great, GG to e^3 in alt, no GG .
Choir, GG to e^3 in alt, no GG♯.
Swell, Fiddle g to e^3 in alt.
Pedal Clavier, GG to Tenor c.

160. St. Botolph, Aldgate.

There is a fine Organ in St. Botolph's Church, Aldgate. The Great Organ was made by Smith in 1676: the rest is by Byfield. The IV-rank Sesquialtera in the Great Organ commences with a Fifteenth. The following is a list of the Stops:

Great, 8 Stops.

1—Open Diapason.
2—Stopped Diapason, metal Treble.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera, IV ranks.
7—Mixture.... II ranks.
8—Trumpet.

Choir, 5 Stops.

9—Stopped Diapason, wood.
10—Dulciana to Tenor c, in place of Vox Humana.
11—Principal.
12—Flute, metal
13—Bassoon, to Tenor c; used to go through.

Swell Organ, 5 Stops.

14—Open Diapason.
15—Stopped Diapason.
16—Principal.
17—Fifteenth.
18—Hautboy.

Compass.

Great, GG, short octaves, up to d^3 in alt.
Choir, GG, short octaves, up to d^3 in alt.
Swell, Tenor e to d^3 in alt.
Pedal Clavier, octave and a half.

161. St. Ann's, Limehouse.

The new Organ in St. Ann's, Limehouse, was made by Gray and Davison, and is the same which those builders erected in the Great Exhibition building in 1851. It contains 34 Stops, of which the following is a list:

Great, 13 Stops.

1—Double Open Diapason	16 feet.	8—Fifteenth	2 feet.
2—Open Diapason	8 feet.	9—Flageolet, Open	2 feet.
3—Open Diapason	8 feet.	10—Sesquialtera, III ranks	$1\frac{3}{5}$ foot.
4—Stopped Diapason	8 ft. tone.	11—Mixture .... II ranks	$\frac{2}{3}$ foot.
5—Octave	4 feet.	12—Posaune	8 feet.
6—Stopped Flute	4 ft. tone.	13—Clarion	4 feet.
7—Twelfth	$2\frac{2}{3}$ feet.		

Choir, 8 Stops.

14—Dulciana	8 feet.	18—Octave	4 feet.
15—Keraulophon	8 feet.	19—Flute, Open	4 feet.
16—Clarinet Flute	8 ft. tone.	20—Fifteenth	2 feet.
17—Stopped Diapason Bass	8 ft. tone.	21—Clarinet	8 ft. tone.

Swell, 9 Stops.

22—Bourdon	16 ft. tone.	27—Sesquialtera, III ranks	
23—Open Diapason	8 feet.	28—Cornopean	8 feet.
24—Stopped Diapason	8 ft. tone.	29—Oboe	8 feet.
25—Octave	4 feet.	30—Clarion	4 feet.
26—Fifteenth	2 feet.		

Pedal, 4 Stops.

31—Grand Open Diapason	16 feet.	33—Grand Octave	8 feet.
32—Grand Bourdon	16 ft. tone.	34—Grand Bombarde	16 feet.

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Swell to Choir.
3—Great to Pedal.
4—Choir to Pedal.
5—Swell to Pedal.
6—Sforzando Pedal.
7 to 12—Stx Composition Pedals.

Compass.

Great, CC to f^3 in alt.
Choir, CC to f^3 in alt.
Swell Organ, Tenor c (4-ft. compass) to f^3 in alt.
Swell Clavier down to CC, acting on Choir Organ below Tenor c.
Pedal, CCC to Tenor e.

162. Wesleyan Chapel, Poplar.

There is a very fine Organ in the Wesleyan Chapel, Poplar. It was made by Hill, in 1847, and contains 3 Manuals, all of complete CC compass, a Pedal of 6 Stops, and 46 Sounding Stops, of which latter the following is a list:

Great Organ, 15 Stops.

1—Double Open Diapason, to Tenor c	16 feet.	8—Octave Quint	3 feet.
2—Sub-bass, to meet No. 1.	16 feet.	9—Super-octave	2 feet.
3—Open Diapason	8 feet.	10—Sesquialtera, III ranks.	
4—Open Diapason	8 feet.	11—Mixture II ranks.	
5—Stopped Diapason, wood	8 ft. tone	12—Fourniture, III ranks.	
6—Quint	6 feet.	13—Contra Trumpet	16 feet.
7—Octave	4 feet.	14—Posaune	8 feet.
		15—Clarion	4 feet.

Swell Organ, 14 Stops.

16—Double Open Diapason to Tenor c	16 feet.	22—Octave	4 feet.
17—Bourdon, to meet No. 1.	16 ft. tone.	23—Suabe Flute	4 feet.
18—Open Diapason	8 feet.	24—Octave Quint	3 feet.
19—Stopped Diapason Treble	8 ft. tone.	25—Super Octave	2 feet.
20—Stopped Diapason, Bass	8 ft. tone.	26—Sesquialtera, III ranks.	$1\frac{3}{5}$ foot.
21—Dulciana to Tenor c	8 feet.	27—Cornopean	8 feet.
		28—Hautboy	8 feet.
		29—Clarion	4 feet.

Choir Organ, 10 Stops.

30—Viol di Gamba	8 feet.	35—Wald Flute	4 feet.
31—Hohl Flute, to Tenor c	8 feet.	36—Super Octave	2 feet.
32—Stopped Diapason, metal Treble to Tenor c,	8 ft. tone.	37—Piccolo	2 feet.
33—Claribel	8 feet.	38—Krum Horn	8 ft. tone.
34—Gemshorn	4 feet.	39—Fagotto	8 feet.

Pedal, 6 Stops.

40—Open wood Bass	16 feet.	43—Octave Quint	6 feet.
41—Metal Open Bass	16 feet.	44—Super Octave	4 feet.
42—Octave, metal	8 feet.	45—Trombone	16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Swell to Pedal,
4—Coupler, Choir to Pedal.
5—Sforzando Pedal, uniting Great to Swell.
6, 7, 8—Three Composition Pedals.

Compass.

Great, CCC to f^3 in alt, 54 notes.
Swell, the same.
Choir, the same.
Pedal, CCC to Tenor d, 27 notes.

163. Christ Church, Spitalfields.

The Organ in this fine Church is one of the largest and best in the metropolis. It was originally built by Bridge in 1730, for the sum of £600, scarcely half its

real value. In 1822, it was repaired by Mr. Bishop, who introduced the Dulciana into the Choir Organ, in place of the III-rank Mixture. The instrument afterwards suffered materially from water, during the fire that occurred in the steeple, and was subsequently repaired and enlarged by Lincoln, in 1837, who added the Pedal Pipes to GGG, and extended the Swell to Tenor c, besides adding several new Stops. In 1852, the Organ underwent further enlargement, owing to the spirit and musical taste of the Rev. Mr. Stone, the Rector, which amplification was effected by Messrs. Gray and Davison, under the direction of Mr. J. S. Noble, the Organist to the Church. The Spitalfields Organ now contains 45 Sounding Stops, distributed among 3 Manuals and Pedal, in the following manner:

Great Organ, 16 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Clarabella.
5—Principal.
6—Principal.
7—Twelfth.
8—Fifteenth.
9—Fifteenth.
10—Tierce.
11—Sesquialtera, V ranks.
12—Mixture, .. II ranks.
13—Furniture, . III ranks.
14—Posaune.
15—Trumpet.
16—Clarion.

Swell Organ, 14 Stops.

17—Double Diapason.
18—Bourdon.
19—Open Diapason.
20—Open Diapason, to Tenor c.
21—Stopped Diapason, to Tenor c.
22—Stopped Diapason Bass.
23—Principal.
24—Fifteenth.
25—Sesquialtera, III ranks.
26—Mixture. ....II ranks.
27—Contra Fagotto.
28—Cornopean.
29—Oboe.
30—Clarion.

Choir Organ, 11 Stops.

31—Open Diapson.
32—Stopped Diapason.
33—Dulciana.
34—Principal.
35—Flute.
36—Fifteenth.
37—Flageolet.
38—French Horn, to Tenor c.
39—Trumpet, to Tenor c.
40—Cremona.
41—Bassoon.

Pedal Organ, 4 Stops.

42—Open Diapason.
43—Bourdon.
44—Principal.
45—Trombone.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Choir to Great.
3—Coupler, Swell to Choir.
4—Coupler, Great to Swell (Sforzando).
5—Coupler, Choir Sub-octave to Great.
6—Coupler, Great to Pedal.
7—Great Sub-octave to Pedal.
8—Choir to Pedal.
9—Swell to Pedal.
10—Octave Pedal Coupler.
11 to 17—Seven Composition Pedals.

Compass.	
Great, GG to f^3 in alt.	59 notes.
Choir, GG to f^3 in alt.	59 notes.
Swell, CC to f^3 in alt.	54 notes.
Pedal, partly GG to middle e .	34 notes.

Summary of Stops and Pipes.		
Great	16 Stops	1328 pipes.
Choir	11 Stops	551 pipes.
Swell	14 Stops	793 pipes.
Pedal	4 Stops	92 pipes.
	45 Stops.	2769 Pipes.
Couplers ..	9	
Total ..	54	

164. St. Luke's Church, Old Street Road.

The Organ in St. Luke's Church, Old Street Road, was originally built by Bridge, but has been remodelled and almost entirely reconstructed by Gray and Davison. It now consists of 3 Manual Organs of complete compass; an independent Pedal; and 32 Stops, of which the following is a list:

Great, 14 Stops.

1—Sub-octave, Stopped ..	16 ft. tone.	8—Fifteenth	2 feet.
2—Principal, Open	8 feet.	9—Ottavina	2 feet.
3—Principal, Open	8 feet.	10—Seventeenth	$1\frac{3}{5}$ foot.
4—Stopped Principal	8 ft. tone.	11—Sesquialtera, II ranks	$1\frac{1}{3}$ foot.
5—Octave	4 feet.	12—Mixture .... II ranks	$\frac{2}{3}$ foot.
6—Piccolo Flute	4 feet.	13—Trumpet	8 feet.
7—Twelfth	3 feet.	14—Clarion	4 feet.

Choir, 7 Stops.

15—Stopped Flute, Treble .	8 ft. tone.	29—Flageolet	4 feet.
16—Stopped Bass	8 ft. tone.	20—Fifteenth	2 feet.
17—Dulciana	8 feet.	21—Clarinet	8 ft. tone.
18—Octave	4 feet.		

Swell, 9 Stops.

22—Sub-octave, Stopped ..	16 ft. tone.	27—Sesquialtera, III ranks	$1\frac{3}{4}$ foot.
23—Principal	8 feet.	28—Hautboy	8 feet.
24—Concert Flute	8 feet.	29—Cornopean	8 feet.
25—Octave	4 feet.	30—Clarion	4 feet.
26—Fifteenth	2 feet.		

Pedal, 2 Stops.

31—Grand Principal	16 feet.	32—Grand Octave	8 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Swell to Great, Sub-octave.
3—Coupler, Swell to Great, Super-octave.
4—Coupler, Great to Pedal.
5—Coupler, Choir to Pedal.
6—Coupler, Swell to Pedal.
7, 8, 9, 10—Four Composition Pedals.
11 Tremulant Swell.

Compass.

Great, CC to f^3_3 in alt.	Swell, CC to f^3 in alt.
Choir, CC to f^3 in alt.	Pedal, CCC to Tenor e.

165. St. Leonard's, Shoreditch.

This Organ was built by Bridge, in 1757, and contains the following Stops:

Great, 13 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Principal to middle c_1, in place of V-rank Cornet.
6—Twelfth.
7—Fifteenth.
8—Tierce.
9—Sesquialtera, III ranks.
10—Furniture .. II ranks.
11—Trumpet.
12—Trumpet.
13—Clarion.

Choir, 6 Stops.

14—Open Diapason.
15—Stopped Diapason.
16—Principal.
17—Flute.
18—Fifteenth.
19—Cremona to g.

Swell, 6 Stops.

20—Open Diapason.
21—Stopped Diapason.
22—Principal.
23—Fifteenth in place of III-rank Cornet.
24—Hautboy.
25—Trumpet.

Compass.

Great, GG to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Fiddle g to e^3 in alt.
Pedal Clavier, octave and a half; GG to Tenor c.

166. Hackney.

There is a fine Organ in St. John's Church, Hackney, built by Snetzler. It was originally made for the *old* Church, in which edifice it was first erected; but, on the completion of the new Church, it was removed thither, and underwent an extensive repair by Mr. England, in 1797. The compass of the instrument was extended, by being made "long octaves;" a second Open Diapason was introduced into the Great Organ; also a Tierce; the Great and Choir Organs were both provided with new and larger Sound-boards; and the entire instrument was completely remodelled and enclosed in a new Case of mahogany. When the Church was beautified in 1828, the Organ underwent further enlargement and improvement at the hands of the late Mr. Gray, who added an octave of Double Open Pedal Pipes to CCC; a Dulciana to the Choir Organ, in place of the Vox Humana; extended the Swell from Tenor f as far as Tenor c; introduced two Manual Couplers to unite the Swell and Choir to the Great Organ; applied three Composition Pedals to the Great Organ; laid down an Octave and a half of Pedals; and provided the instrument with a new pair of Horizontal Bellows. The Organ now contains 25 Sounding Stops, of which the following is a list:

Great, 12 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason, metal to Middle c^1.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Tierce.
8—Sesquialtera, III ranks.
9—Mixture .... II ranks.
10—Cornet, to Middle c^1, V ranks.
11—Trumpet.
12—Clarion.

Choir, 6 Stops.

13—Stopped Diapason, wood.
14—Dulciana.
15—Principal.
16—Flute, metal.
17—Fifteenth.
18—Bassoon throughout.

Swell, 6 Stops.

19—Open Diapason.
20—Stopped Diapason, metal to Middle c^1.
21—Principal.
22—Cornet, III ranks.
23—Hautboy.
24—Trumpet.

Pedal, 1 Stop.

25—Open Pipes, one octave, CC to CCC, 16 feet length.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Choir to Great.
3—Coupler, Great to Pedal.
4—Coupler, Choir to Pedal.
5, 6, 7—Three Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Tenor c to f^3 in alt.
Pedal Clavier, GG to Tenor c.

The quality of tone of the instrument is excellent throughout. The old Open Diapason, by Snetzler, is of very superior tone; the second one, added by England, is also a very good Stop, and mixes well with the rest of the instrument. The metal Stopped Diapasons in the Great and Swell are very clear and pure in quality. The instrument possesses the advantages of standing in a good situation, and being placed in a Church that is favorable to sound.

167. St. Mary's Catholic Chapel, Moorfields.

The Organ in St. Mary's Catholic Chapel, Moorfields, was built by Bevington and Son. It contains 31 Sounding Stops, of which the following is a list:

Great, 13 Stops.

1—Open Diapason, metal, No. 1.
2—Open Diapason, ditto, No. 2.
3—Open Diapason, small, No. 3.
4—Stopped Diapason, No. 1.
5—Stopped Diapason, No. 2.
6—Principal, large, No. 1.
7—Principal.....No. 2.
8—Twelfth.
9—Fifteenth.
10—Sesquialtera, IV ranks.
11—Mixture... III ranks.
12—Trumpet.
13—Clarion.

Choir, 8 Stops.

14—Open Diapason.
15—Stopped Diapason.
16—Dulciana.
17—Principal.
18—Flute.
19—Fifteenth.
20—Mixture, III ranks.
21—Cremorne.

Swell, 9 Stops.

22—Double Diapason.
23—Open Diapason.
24—Stopped Diapason.
25—Claribel.
26—Principal.
27—Cornet, III ranks.
28—Trumpet.
29—Clarion.
30—Oboe.

Pedal, 1 Stop.

31—Open Pipes from CC down to FFFF..24 feet length.

Accessory Stops, Movements, &c.

1, 2, 3—Three Couplers. | 4 to 12—Nine Composition Pedals.

Compass.

Great, FFF to f^3 in alt. | Swell, FF to f^3 in alt.
Choir, FFF to f^3 in alt. | Pedal, FFF to Tenor c.

168. St. Mark's, Pentonville.

A fine Organ, built by Gray. It contains 26 Sounding Stops, of which the following is a list:

Great, 10 Stops.

1—Open Diapason. | 6—Fifteenth.
2—Open Diapason. | 7—Sesquialtera, III ranks.
3—Stopped Diapason. | 8—Mixture.... II ranks.
4—Principal. | 9—Trumpet.
5—Twelfth. | 10—Clarion.

Choir, 8 Stops.

11—Open Diapason. | 15—Flute.
12—Stopped Diapason. | 16—Fifteenth.
13—Dulciana. | 17—Bassoon.
14—Principal. | 18—Cromorne.

Swell, 7 Stops.

19—Double Dulciana. | 23—Dulciana.
20—Open Diapason. | 24—Hautboy.
21—Stopped Diapason. | 25—Trumpet.
22—Principal.

Pedal, 1 Stop.

26—Open Pipes to CCC, 16 feet length.

169. St. Dunstan's in the West, Fleet Street.

The Organ in St. Dunstan's Church, Fleet Street, was built by T. R. Robson, in 1834. It contains 24 Sounding Stops, of which the following is a list:

Great, 9 Stops.

1—Open Diapason, large. | 6—Fifteenth.
2—Open Diapason, small. | 7—Sesquialtera, III ranks.
3—Stopped Diapason. | 8—Mixture.... II ranks.
4—Principal. | 9—Trumpet.
5—Twelfth.

Choir, 7 Stops.

10—Dulciana, all through. | 14—Fifteenth.
11—Stopped Diapason. | 15—Cremona.
12—Principal. | 16—Bassoon.
13—Flute.

Swell, 7 Stops.

17—Double Diapason. | 21—Flute.
18—Open Diapason. | 22—Trumpet.
19—Stopped Diapason. | 23—Oboe.
20—Principal.

Pedal, 1 Stop.

24—Open Pipes, CC down to GGG.. 21⅓ feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Choir to Pedal.
4—Choir to Great, Sub-octave.
5, 6, 7—Three Composition Pedals.

Compass.

Great, GG with GG♯ to f³ in alt.
Choir, the same.
Swell, Tenor f to f³ in alt.
Pedal, GG to Tenor c.

170. Foundling Hospital.

The new Organ for the Foundling Hospital is being built by Bevington, from a Specification prepared by Mr. Willing, the Organist to the Chapel. It is to consist of 49 Sounding Stops, 3 Manuals, and Pedal. The following is a list of the Stops which it is to contain:

Great, 18 Stops.

	Pipes.	Feet.		Pipes.	Feet.
1—Double Open Diapason to the Tenor c key	49..	16	9—Principal, No. 2	61..	4
2—Bourdon, CCC to BB.	12..	16 tone.	10—Wald Flute, to Tenor c	49..	4
3—Open Diapason, No. 1,	61..	8	11—Twelfth	61..	2⅔
4—Open Diapason, No. 2,	61..	8	12—Fifteenth	61..	2
5—Open Diapason, No. 3, large scale	61..	8	13—Sesquialtera	244..	IV rks.
6—Stopped Diapason, through	61..	8 tone.	14—Mixture	183..	III rks.
7—Clarabella, to Fiddle g	42..	8	15—Furniture	183..	III rks.
8—Principal, No. 1	61..	4	16—Trumpet	61..	8
			17—Tromba, Solo Stop	49..	8
			18—Clarion	61..	4

Choir, 11 Stops.

	Pipes.	Feet.		Pipes.	Feet.
19—Dulciana Treble	49..	8	25—Suabe Flute, Tenor c.	49..	4
20—Dulciana Bass	12..	8	26—Fifteenth	61..	2
21—Viol da Gamba, Tenor c	49..	8	27—Piccolo, Tenor c	49..	2
22—Stopped Diapason	61..	8 tone.	28—Double Bassoon, Tenor c	49..	16
23—Principal	61..	4	29 Clarionette, Tenor c	49..	8 tone.
24—Wald Flute, Tenor c.	49..	4			

Swell, 15 Stops.

	Pipes.	Feet.		Pipes.	Feet.
30—Double Open Diapason, to Fiddle G key	42..	16	36—Viol da Gamba, Tenor c	49..	8
31—Bourdon Bass, CCC to FF♯	19..	16 tone.	37—Principal	61..	4
32—Open Diapason	61..	8	38—Open Flute, Tenor c.	49..	4
33—Stopped Diapason, Treble	49..	8 tone.	39—Triplet	183..	III rks.
34—Stopped Diapason, Bass	12..	8 tone.	40—Doublette	122..	II rks.
35—Dulciana, Tenor c	49..	8	41—Trombone	61..	16
			42—Cornopean	61..	8
			43—Oboe	61..	8
			44—Clarion	61..	4

Pedal, 5 Stops.

	Pipes.	Feet.		Pipes.	Feet.
45—Open Diapason, wood	30..	16	48—Principal .. metal	30..	8
46—Open Diapason, metal	30..	16	49—Trombone..metal	30..	16
47—Bourdon .... wood	30..	16 tone.			

Also, by means of an octave coupler, and an additional octave of Pipes above Tenor f,

	Pipes.	Feet.		Pipes.	Feet.
a—Octave .... wood..	12..	8	d—Fifteenth .. metal..	12..	4
b—Principal .. metal .	12..	8	e—Trumpet .. metal..	12..	8
c—Bass Flute.. wood .	12..	8 tone.			

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Swell to Choir.
3—Pedal to Great.
4—Pedal to Swell.
5—Pedal to Choir.
6—Octave up to Great.
7 to 15—Nine Composition Pedals.

Compass.

Great, CC to c^4 in altissimo, 5 complete octaves.
Choir, CC to c^4 in altissimo, ditto.
Swell, CC to c^4 in altissimo, ditto.
Pedal Organ, CCC to Middle f^1, $3\frac{1}{2}$ octaves.
Pedal Clavier, CCC to Tenor f, $2\frac{1}{2}$ octaves.

171. St. Clement Dane's, Strand.

A good Organ, built by Schmidt, and altered by Hill.

Great—GG to D.

1—Open Diapason.
2—Open Diapason, Gamut G.
3—Stopped Diapason.
4—Principal.
5—Flute.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, IV ranks.
9—Mixture ... III ranks.
10—Trumpet.

Choir—GG to D.

11—Stopped Diapason.
12—Principal.
13—Flute.
14—Fifteenth.
15—Cremona.

Swell—Tenor F to D.

16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Cornet, IV ranks.
20—Trumpet.
21—Oboe.
22—Clarion.

Pedal, 1 Stop.

23—$1\frac{1}{2}$ octave of Pedal Pipes, GG (unisons).

172. St. Martin's Hall.

The new Organ for St. Martin's Hall is being built by Messrs. Hill and Co. When completed, it will contain the 40 Sounding Stops mentioned below:

Great, 14 Stops.

1—Double Open Diapason, metal and wood ..	16 feet.	8—Flute	4 feet.
2—Open Diapason	8 feet.	9—Octave Quint	$2\frac{2}{3}$ feet.
3—Spitzflute	8 feet.	10—Fifteenth	2 feet.
4—Stopped Diapason ..	8 feet tone.	11—Sesquialtera, III ranks.	2 feet.
5—Quint.....	$5\frac{1}{3}$ feet.	12—Mixture.... II ranks.	
6—Principal	4 feet.	13—Posaune	8 feet.
7—Gemshorn	4 feet.	14—Clarion	4 feet.

Choir, 11 Stops.

15—Bourdon, throughout .	16 feet tone.	21—Fifteenth	2 feet.
16—Dulciana	8 feet.	22—Piccolo	2 feet.
17—Gamba	8 feet.	23—Cymbal, II ranks.	
18—Stopped Diapason ..	8 feet tone.	24—Double Bassoon	16 feet.
19—Octave	4 feet.	25—Clarinet	8 feet tone.
20—Flute	4 feet tone.		

Swell, 10 Stops.

26—Double Stopped Diapason..... 16 feet tone.
27—Open Diapason.... 8 feet.
28—Stopped Diapason... 8 feet tone.
29—Principal..... 4 feet.
30—Fifteenth..... 2 feet.
31—Mixture, III ranks.
32—Hautboy..... 8 feet.
33—Cornopean..... 8 feet.
34—Clarion..... 4 feet.
35—Vox Humana..... 8 feet tone.

Pedal, 5 Stops.

36—Open Diapason..... 16 feet.
37—Violone..... 16 feet.
38—Bourdon..... 16 feet tone.
39—Principal..... 8 feet.
40—Posaune..... 16 feet.

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Great to Pedal.
3—Choir to Pedal.
4, 5, 6—Three Composition Pedals.

Compass.

Great, CC to a^3 in altissimo.
Choir, CC to a^3 in altissimo.
Swell, Tenor c to a^3 in altissimo.
Pedal, CCC to Tenor f.

173. German Lutheran Church, Savoy, Strand.

The Organ in the German Lutheran Church in the Savoy, Strand, was built by Snetzler. It contains 18 Stops, of which the following is a list:

Great, 8 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera, III ranks.
7—Trumpet.
8—Cornet, mounted, V ranks.

Choir, 6 Stops.

9—Open Diapason.
10—Stopped Diapason.
11—Principal.
12—Flute.
13—Fifteenth.
14—Bassoon.

Swell, 4 Stops.

15—Open Diapason.
16—Principal.
17—Hautboy.
18—Trumpet.

Accessory Stops, Movements, &c.

1—Coupler, Choir to Great.
2—Coupler, Swell to Great.
3—Tremulant; part of Snetzler's original work.

Compass.

Great, FFF to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Fiddle g to e_3 in alt.
Pedal Clavier, FFF to Tenor c.

174. Exeter Hall.

The large Organ in Exeter Hall was built expressly for the Sacred Harmonic Society, in the year 1839, by Mr. Joseph William Walker, of Francis Street, Tottenham Court Road. The exterior, which corresponds with the architecture of the Hall, was designed by Mr. Robert R. Banks. The width of the instrument is thirty feet, and the height forty; the depth in the lower part is four feet six inches only, the Directors of the Hall having limited the builder to these dimen-

sions, to prevent a loss of space on the platform when public meetings are held. Within this lower part, the bellows, four in number, are placed; while above, at the height of twelve feet from the floor, comes the main body of the Organ, carried out on projecting cantilions or consoles. Over each console rises a circular turret of gilt pipes, surmounted by an ornament imitative of that beautiful ancient specimen, the choragic monument of Lysicrates. The two centre towers are considerably higher than the outer ones, and project five feet each beyond the body of the instrument; the longest pipes in these towers measure twenty feet from the base and sixteen from the body (C and C sharp); the circumference is forty-five inches, the diameter fifteen inches, and the weight of each four cwt. The whole front of the organ, including the circular ends (which are novel features in the design), is divided into eleven compartments of gilt pipes. The keys are so arranged that the organist, when playing, faces the conductor and the audience, instead of sitting with his back towards them. In 1849, the Pneumatic action for lightening the touch was added to the Organ, this being the first instance of its employment by any of the London builders. Larger and more powerful Reed Stops were at the same time introduced into the Great Organ and Swell. Still more recently, the instrument was enlarged and partly remodelled, under the direction of Mr. Brownsmith, Organist to the Society for which it was built. Two Reeds on a heavy pressure of wind were added to the Swell, and the Double Diapason turned into a Second Unison Open; the compass of the Swell was extended from FF down to CC; a third Open Diapason and a Second Principal were introduced into the Great Organ, and the system of equal temperament adopted for the tuning; the latter improvement at the suggestion of Mr. Costa.

The Organ now contains 41 Sounding Stops, of which the following is a list:

Great, 13 Stops.

1—Open Diapason.
2—Open Diapason, large.
3—Open Diapason, small.
4—Stopped Diapason.
5—Principal, large.
6—Principal.
7—Twelfth.
8—Fifteenth.
9—Sesquialtera, III ranks.
10—Mixture, .. II ranks.
11—Furniture, .. II ranks.
12—Trumpet.
13—Clarion.

Choir, 7 Stops.

14—Open Diapason.
15—Stopped Diapason.
16—Dulciana to FF.
17—Principal.
18—Metal Flute.
19—Fifteenth.
20—Cremona to Fiddle g.

Swell, 13 Stops.

21—Open Diapason.
22—Open Diapason, large.
23—Stopped Diapason.
24—Dulciana.
25—Principal.
26—Metal Flute.
27—Fifteenth.
28—Sesquialtera, III ranks.
29—Horn.
30—Oboe.
31—Clarion.
32—Ophicleide, 8 feet, } on a
33—Ophicleide, 4 feet, } heavy wind.

Pedal, 8 Stops.

34—Double Open to FFFF	32 feet.	38—Fifteenth.....	8 feet.
35—Open Diapason, wood.	16 feet.	39—Sesquialtera, III ranks	
36—Open Diapason, metal.	16 feet.	40—Trombone.....	16 feet.
37—Principal	8 feet.	41—Trumpet	8 feet.

Accessory Stops, Movements, &c.

1—Swell to Great.	6 to 12—Seven Composition Pedals; viz. 3 to Great, 2 to Swell, and 2 to Pedal.
2—Choir to Great.	
3—Great to Pedal.	
4—Choir to Pedal.	13—Pneumatic attachment.

Compass.

Great and Choir, FFF to g^3 in altissimo. Swell, CC to g^3 in altissimo.	Pedal, CCC to Tenor e.

175. St. Martin-in-the-Fields.

This Organ, built by Messrs. Bevington, for the Parish Church of St. Martin-in-the-Fields, erected by voluntary subscription, 1854, contains three Manuals, from CC to G in alt (56 keys), and Pedal Organ, $2\frac{1}{2}$ Octaves (30 keys); Two Pairs of double-action Bellows, with inverted rib, 10 feet long by 7 feet wide, and 59 Register Stops.

The whole is enclosed in two richly carved cases of solid Wainscoat Oak, from the designs of Thomas Allom, Architect, M. I. B. A. The large case, 29 feet in height by 19 feet in width, contains the Great, the Swell, and the Pedal Organs, all the gilt front Pipes, forming the lower notes of the Diapasons, the centre Pipe, CCC, being 18 feet in length. The smaller Case in front of the lower Gallery, 10 feet wide by 12 feet in height, contains the Choir Organ, the front gilt Pipes also forming a portion of the interior Stops.

Great Organ, CC to G, 18 Stops.

Stops.				Pipes.
1—Double Diapason,	metal ..... CCC..	16 ft.	.....	12
2—Ditto, ditto	ditto .....CC..	16 ft.	.....	44
3—Open Diapason,	ditto, large scale, No. 1	8 ft.	.....	56
4—Ditto, ditto	ditto..... No. 2	8 ft.	.....	56
5—Hohl Diapason	ditto .....Tenor C..	8 ft.	.....	44
6—Stop Diapason,	wood	8 ft.	tone	12
7—Claribel	ditto	8 ft.	.....	44
8—Principal	No. 1	4 ft.	.....	56
9—Quint, double twelfth		6 ft.	.....	56
10—Decima, tenth.....		3 ft. 6 in.	.....	56
11—Twelfth		3 ft.	.....	56
12—Fifteenth.....		2 ft.	.....	56
13—Sesquialtera, IV ranks ...			.....	224
14—Furniture,.. III ranks			.....	168
15—Mixture.... III ranks			.....	168
16—Wald Flute, ...Tenor C..		4 ft.	.....	44
17—Trumpet.....CC..		8 ft.	.....	56
18—Clarion		4 ft.	.....	56
				1264

Swell Organ, CC to G.

Stops.			Pipes.
19—Bourdon, Double Diapason, wood	16 ft. tone.		56
20—Double Diapason, metal ..... C..	16 ft.		
21—Open Diapason, metal .... CC..	8 ft.		56
22—Dulciana, small scale ..... metal, Tenor C..	8 ft.		44
23—Stop Diapason ..... Bass	8 ft. tone.		56
24—Ditto, ditto ..... Treble	8 ft. tone.		
25—Flute	4 ft. tone.		56
26—Principal	4 ft.		56
27—Twelfth	3 ft.		56
28—Fifteenth	2 ft.		56
29—Sesquialtra, .. IV ranks			280
30—Trombone, double reed ..... CCC..	16 ft.		56
31—Cornopean ..... CC..	8 ft.		56
32—Oboe ..... CC..	8 ft.		56
33—Clarion. ..... CC..	4 ft.		56
			940

Choir Organ, CC to G.

34—Bourdon Double Diapason, wood	16 ft. tone.		56
35—Double Diapason, ... ditto, .. Tenor C..	16 ft.		
36—Open Diapason ..... metal ..... CC..	8 ft.		56
37—Viol de Gamba ..... Tenor C..	8 ft.		44
38—Dulciana.. ..... Tenor C..	8 ft.		44
39—Claribel ..... C..	8 ft. tone		56
40—Stop Diapason Bass.	8 ft.		
41—Principal	4 ft.		56
42—Flute	4 ft.		56
43—Mixture, III ranks ..... Dulciana Scale	2 ft.		168
44—Clarionet ..... Tenor C..	8 ft.		44
45—Bassoon, double reed ..... Tenor C..	16 ft.		44
			624

Pedal Organ, CCC to F.—30 Notes.

46—Great Open Diapason, .. wood	16 ft.		30
47—Bourdon ..... ditto	16 ft. tone.		30
48—Unison Open Diapason . metal	8 ft.		30
49—Unison Stop Diapason .. wood	8 ft. tone.		30
50—Principal ..... metal	4 ft.		30
51—Great Trombone ..... metal	16 ft.		30
52—Trumpet ..... metal	8 ft.		30
53—Quint and Decima .... metal			60
54—Twelfth and Fifteenth . metal			60
			330

Movements.

Nine Composition Pedals—Three to each Organ.

3 to Great Organ
3 to Choir Organ } to shift the Stops.
3 to Swell Organ

Five Couplers; viz.

1—Pedals to Great Organ Keys.
2—Pedals to Choir Organ Keys.
3—Pedals to Swell Organ Keys.
4—Swell Manual to Great Manual.
5—Swell Manual to Choir Manual.

The Stops belonging to the Great Organ have their names engraved in white letters on a blue ground. Those of the Swell, white letters on a red ground. The Choir Organ, black letters on Mother-of-Pearl. The Pedal Organ, red letters on plain Ivory. The Couplers, black letters on plain Ivory.

	Total. Draw Stops.	Pipes.
Great Organ.....	18	1264
Swell Organ.....	15	940
Pedal Organ.....	9	330
Choir Organ.....	12	624
Couplers	5	
	59	3158

176. Chapel Royal, Whitehall.

This Organ was originally built by Father Schmidt The Case and some of the original Wood Pipes remain to this day. It is in oak, of noble design, with four towers, and most elaborately carved, about 24 feet high by 10 feet in breadth, surmounted with the Royal Arms. It was rebuilt in 1814, by Elliott; it then had 20 Stops. In 1844, Messrs. Hill and Son added an entire new Swell, of large dimensions, and other improvements, at the suggestion of the officiating Organist, Mr. Massey. The Organ now contains 4 Manuals and 33 Sounding Stops. Compass, from GG to F in alt. Pedal Pipes from FFF up, twenty-one notes to D, with Choir Organ in front of the Gallery.

Great, 8 Stops.

1—Open Diapason.	5—Fifteenth.
2—Stopped Diapason.	6—Sesquialtera, III ranks.
3—Principal.	7—Mixture,.... II ranks.
4—Twelfth.	8—Trumpet.

Choir, 6 Stops.

9—Open Diapason.	12—Viol da Gamba.
10—Stopped ditto (Treble)	13—Principal.
11—Ditto ditto (Bass)	14—Bassoon.

Swell, 14 Stops.—Down to FF.

15—Bourdon.	22—Fifteenth.
16—Tenoroon.	23—Sesquialtera,
17—Open Diapason	24—Mixture.
18—Claribella.	25—Corno (Basso).
19—Stopped Diapason (Bass).	26—Cornopean.
20—Flageolet.	27—Clarion.
21—Principal.	28—Hautboy.

Solo, 4 Stops.

29—Open Diapason.	31—Flute.
30—Stopped Diapason.	32—Cromorne.

Pedal, 1 Stop.

Open Pipes to FFF, 12 feet.

Couplers.

1—Pedals to Great.	3—Swell to Great.
2—Ditto to Choir.	4—Swell to Choir (octave below).

177. St. Margaret's, Westminster.

The fine Organ in St. Margaret's Church, Westminster, was built by Avery, in 1804, and cost eight hundred guineas and the old Organ by Father Smith, for which Avery allowed two hundred pounds. The present instrument contains the following Stops:

Great, 11 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Clarabella, in place of Cornet.
4—Principal.
5—Nason.
6—Twelfth.
7—Fifteenth.
8—Tierce.
9—Sesquialtera, III ranks.
10—Mixture, .. II ranks.
11—Trumpet.

Choir, 7 Stops.

12—Stopped Diapason.
13—Dulciana.
14—Principal.
15—Flute.
16—Fifteenth.
17—Furniture, II ranks.
18—Cremona.

Swell, 6 Stops.

19—Open Diapason.
20—Stopped Diapason.
21—Principal.
22—Cornet, III ranks.
23—Trumpet.
24—Hautboy.

Pedal, 1 Stop.

25—Open Pipes, one Octave, Gamut G down to GG, $10\frac{2}{3}$ feet length.

Couplers.

1—Swell to Great.
2—Great to Pedal.
3—Choir to Pedal.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Fiddle g to f^3 in alt.
Pedal, GG to Gamut G, one octave.

178. St. Philip's, Waterloo Place.

The Organ in St. Philip's Chapel, Waterloo Place, is a very good instrument, built by Davis. It consists of the following Stops:

Great, 8 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera, III ranks.
7—Mixture,....II ranks.
8—Trumpet.

Choir, 4 Stops.

9—Stopped Diapason.
10—Dulciana.
11—Principal.
12—Flute.

Swell, 6 Stops.

13—Open Diapason.
14—Stopped Diapason.
15—Principal.
16—Cornet, III ranks.
17—Trumpet.
18—Hautboy.

Pedal, 1 Stop.

19—Open Pipes to CCC.

179. St. James's, Piccadilly.

The Organ, by Harris, that was placed in this Church immediately after its erection, was given by Queen Mary, in 1691; having been before "in ye Greate Chappell at Whitehall, which heretofore ye Papist possessed." In 1852, an entirely new inside was put to the instrument, with the exception of a fine Metal Stopped Diapason and the front Open Diapason, which are retained. The handsome old Case is also preserved; the new Choir Organ being enclosed in a new and separate Case, placed in front of the Gallery. The present instrument contains 36 Sounding Stops, distributed among 3 Manuals and Pedal in the following manner:

Great, 12 Stops.

1—Open Diapason.....	8 feet.	7—Twelfth	2⅔ feet.
2—Open Diapason	8 feet.	8—Fifteenth	2 feet.
3—Stopped Diapason,— metal Treble	8 feet tone.	9—Sesquialtera, III rnks.	1⅗ foot.
4—German Flute.....	8 feet.	10—Mixture,.. III rnks.	⅘ foot.
5—Principal	4 feet.	11—Posaune.....	8 feet.
6—Flageolet.....	4 feet.	12—Clarion.....	4 feet.

Swell, 11 Stops.

13—Bourdon	16 feet tone.	19—Mixture, III ranks..	⅘ foot.
14—Open Diapason	8 feet.	20—Contra Fagotto	16 feet.
15—Stopped Diapason ...	8 feet tone.	21—Cornopean	8 feet.
16—Principal	4 feet.	22—Hautboy	8 feet.
17—Fifteenth	2 feet.	23—Clarion	4 feet.
18—Sesquialtera, III rnks.	1⅗ foot.		

Choir, 10 Stops.

24—Open Diapason.....	8 feet.	29—Flute.....	4 feet.
25 { Clarabella Treble.... / Stopped Bass..... }	8 feet.	30—Fifteenth	2 feet.
26—Dulciana.....	8 feet.	31—Piccolo, ...	2 feet.
27—Viol de Gamba.....	8 feet.	32 { Cremona Treble.... / Bassoon Bass..... }	8 feet.
28—Principal	4 feet.		

Pedal, 4 Stops.

33—Open Diapason	16 feet.	35—Principal.....	8 feet.
34—Bourdon.....	16 feet tone.	36—Fifteenth.....	4 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	5—Coupler, Swell to Pedal.
2—Coupler, Choir to Great.	6—Coupler, Choir to Pedal.
3—Coupler, Swell to Choir.	7 to 15—Nine Composition Pedals.
4—Coupler, Great to Pedal.	

Compass.

All the Manuals, CC to f^3 in alt.	Pedal, CCC to Tenor e.

180. St. George's, Hanover Square.

The Organ in St. George's Church, Hanover Square, was built by Gerard Smith, and has been repaired by Bishop.

Great, 9 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Trumpet.
9—Clarion.

Choir, 6 Stops.

10—Stopped Diapason Bass, Claribella Treble
11—Dulciana.
12—Principal.
13—Flute.
14—Fifteenth.
15—Cremona.

Swell, 6 Stops.

16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Trumpet.
20—Hautboy.
21—Octave Hautboy.

Pedal, one Pipe, viz. GG♯.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedals.
3—Coupler, Choir to Pedals.
4, 5, 6—Three Composition Pedals.

Compass.

Great, GG to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Tenor c to e^3 in alt.
Swell Clavier, down to GG, acting on Choir Organ below Tenor c.
Pedal Clavier, GG to Tenor c.

181. Hanover Square Rooms.

The new Organ in the Concert Room, Hanover Square, was built by Gray and Davison. It contains 17 Stops, of which the following is a list:

Great, 10 Stops.

1—Open Diapason.....	8 feet.	6—Flute.....	4 feet.
2—Clarinet Flute to Tenor c.....	8 feet tone.	7—Twelfth.....	$2\frac{2}{3}$ feet.
3—Dulciana, to Tenor c..	8 feet.	8—Fifteenth.....	2 feet.
4—Stopped Diapason, Bass	8 feet tone	9—Sesquialtera, III rnks.	$1\frac{3}{5}$ foot.
5—Octave	4 feet.	10—Trumpet.....	8 feet.

Swell, 6 Stops.

11—Double Stopped Diapason	16 feet tone.	14—Octave.....	4 feet.
12—Open Diapason.....	8 feet.	15—Fifteenth	2 feet.
13—Stopped Diapason, ..	8 feet tone.	16—Cornopean	8 feet.

Pedal, 1 Stop.

17—Grand Open Diapason 16

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Great to Pedal.
3, 4, 5—Three Composition Pedals.

Compass.

Great, CC to f^3 in alt.	Swell Clavier, to CC, acting on Great
Swell Organ, Tenor c to f^3 in alt.	below Tenor c.
	Pedal, CCC to Tenor e.

182. The Cyclorama.

The new Apollonicon Organ in the Colosseum, Regent's Park, was erected by Bevington and Sons, to accompany the Diorama of Lisbon. It contains 3 Manuals, a Pedal Organ, and 47 Sounding Stops.

Great, 16 Stops.

1—Tenoroon.	9—Super Octave.
2—Bourdon.	10—Doublette.... II ranks.
3—Unison, metal.	11—Sesquialtera,.. IV ranks.
4—Unison, wood.	12—Furniture, .. III ranks.
5—Claribella.	13—Trumpet.
6—Contra Bass.	14—Trombone.
7—Octave.	15—Clarion.
8—Twelfth.	16—Octave Clarion.

Solo, 11 Stops.

17—Double Stopped Diapason, 16 ft. tone.	23—Suabe Flute.
18—Salcional.	24—Piccolo.
19—Viol da Gamba.	25—Bassoon.
20—Claribella.	26—Clarionet.
21—Unison, Bass.	27—Oboe.
22—Wald Flute.	

Swell, 15 Stops.

28—Tenoroon.	36—Flageolet.
29—Flauto Unisone, metal.	37—Triplette.
30—Flauto Unisone, wood.	38—Posaune.
31—Quint.	39—Cornopean.
32—Octave	40—French Horn.
33—Wald Flute.	41—Clarion.
34—Octave Quint.	42—Octave Clarion.
35—Doublette.	

Pedal, 5 Stops.

43—Double Open Diapason..	16 feet.	46—Great Ophicleide.....	16 feet.
44—Unisone, wood.....	8 feet.	47—Trombone.....	8 feet.
45—Principal	4 feet.		

A set of Kettle Drums, Triangle, Cymbals, and Effects for the Storm, worked by the one performer.

The roll of the drum is done by machinery, set in motion by the performer. The kettle-drums are those used at the great Commemoration of Handel, about seventy years since, and are very large.

183. St. Katherine's, Regent's Park.

The Organ in St. Katherine's Church, Regent's Park, removed from the demolished Collegiate Church of the same name near the Tower, is one of Green's finest instruments. It was built in 1778, under the direction of Joah Bates; and comprises Great and Choir Organs from GG ($10\frac{2}{3}$ feet compass) up to e^3 in alt.;

and a Swell down to Gamut G ($5\frac{1}{3}$ feet compass), a most extensive and excellent range for the period. Below G, the Swell-keys act on the Choir Organ. The following is a list of the Stops in the above-mentioned instrument:

Great, 10 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Mixture..... II ranks.
9—Trumpet.
10—Cornet, ...IV ranks.

Choir, 5 Stops.

11—Stopped Diapason.
12—Principal.
13—Flute.
14—Fifteenth.
15—Bassoon.

Swell, 6 Stops.

16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Cornet, III ranks.
20—Trumpet.
21—Hautboy.

Pedal, 1 Stop.

22—An Octave of Open Pipes to CCC, 16 feet length.

Pedal Clavier to GG.

184. Christ Church, Marylebone.

The Organ in Christ Church, Marylebone, was made by Bishop, in 1825. It contains 22 Sounding Stops, of which the following is a list:

Great, 9 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Mixture .... II ranks.
9—Trumpet.

Choir, 6 Stops.

10—Dulciana.
11—Stopped Diapason (Claribella treble).
12—Principal.
13—Flute.
14—Fifteenth.
15—Cremona.

Swell, 6 Stops.

16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Horn.
20—Trumpet.
21—Hautboy.

Pedal, 1 Stop.

22—Open Diapason..16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Choir to Pedal.
4, 5, 6—Three Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Tenor c to f^3 in alt.
Pedal, CCC to Fiddle g.

185. Chapel Royal, St. James's.

The Organ in the Chapel Royal, St. James's, was a present from His late Majesty William the Fourth; and was built by Hill and Davison, in 1837. It contains 30 Sounding Stops, of which the following is a list:

Great, 11 Stops.

1—Open Diapason, No. 1.
2—Open Diapason, No. 2.
3—Stopped Diapason.
4—Principal (metal).
5—Principal (wood).
6—Twelfth (metal).
7—Fifteenth (wood).
8—Fifteenth (metal).
9—Sesquialtera, IV ranks.
10—Trumpet.
11—Octave Trumpet or Clarion.

Choir, 8 Stops.

12—Open Diapason.
13—Dulciana.
14—Stopped Diapason.
15—Flute.
16—Principal.
17—Fifteenth.
18—Cromorne.
19—Bassoon.

Swell, 10 Stops.

20—Open Diapason.
21—Dulciana.
22—Claribella.
23—Stopped Diapason.
24—Principal.
25—Fifteenth.
26—French Horn.
27—Oboe.
28—Trumpet.
29—Clarion.

Pedal, 1 Stop.

30—Unison Open Pipes to GG .. $10\frac{2}{3}$ feet.

Accessory Stops, Movements, &c.

1 to 4—Four Couplers.
5 to 7—Three Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Gamut G to f^3 in alt.
Pedal, from GG, an octave and a half.

186. St. Paul's, Wilton Place, Knightsbridge.

This fine Organ, built by Gray and Davison, is one of the largest and best instruments in the metropolis. It consists of four rows of keys, 43 Sounding Stops, and has an independent Pedal Organ, an octave lower than the Manuals, of two octaves and three notes in compass, CCC, 16 feet, to E, with *nine* ranks of pipes throughout. The following is a list of the Stops:

Great, 13 Stops.

1—Double Diapason, bass 16 feet.
2—Double Diapason, treb. 16 feet.
3—Open Diapason .... 8 feet.
4—Open Diapason .... 8 feet.
5—Stopped Diapason... 8 feet.
6—Principal ..... 4 feet.
7—Twelfth ..... 3 feet.
8—Fifteenth ..... 2 feet.
9—Sesquialtera, IV ranks.
10—Mixture.... II ranks.
11—Furniture .. II ranks.
12—Trumpet ..... 8 feet.
13—Clarion ..... 4 feet.

Choir, 11 Stops.

14—Dulciana	8 feet.	19—Flute	4 feet.
15—Keraulophon (new stop)	8 feet.	20—Principal	4 feet.
16—Stopped Diapason, Bass	8 feet.	21—Piccolo	2 feet.
17—Stopped Diapason, Treble	8 feet.	22—Fifteenth	2 feet.
		23—Mixture, II ranks ..	1½ foot.
18—Claribella Flute	8 feet.	24—Clarionet	8 feet.

Swell, 13 Stops.

25—Double Diapason, Bass	16 feet.	31—Fifteenth	2 feet.
26—Double Diapason, Treble	16 feet.	32—Sesquialtera, III ranks.	
		33—Mixture.... II ranks.	
27—Open Diapason	8 feet.	34—Hautboy	8 feet.
28—Stopped Diapason...	8 feet.	35—Cornopean	8 feet.
29—Principal	4 feet.	36—Trumpet	8 feet.
30—Flute	4 feet.	37—Clarion	4 feet.

Pedal, 6 Stops.

38—Open Diapason	16 feet.	41—Fifteenth	4 feet.
39—Stopped Diapason...	16 feet.	42—Sesquialtera, IV ranks.	
40—Principal	8 feet.	43—Trombone	16 feet.

Copulæ.

1—Swell to Great Manual.	4—Great Manual to Pedals.
2—Swell to Choir Manual.	5—Choir Manual to Pedals.
3—Swell Manual to Pedals.	

The Swell Organ is of the same compass as the Great and Choir Organs—CC, 8 feet—and is of an improved construction. The four reed stops, Hautboy, Cornopean, Trumpet, and Clarion, as well as the Double Diapason of 16 feet, are throughout the whole compass of this part of the instrument. In the Choir Organ are five solo stops; amongst them, one of quite a new description, which was introduced *for the first time* in this instrument. There are eight Composition Pedals, to change the stops in the various organs.

187. St. Michael's, Chester Square.

This instrument, built by T. J. Robson, in 1847, is designed upon the German principle, with especial reference to the requirements of an Organ intended for the accompaniment and support of congregational singing. It consists of three Manual Organs, viz. Swell, Great, and Choir, together with an independent Pedal Organ. The Manuals are of the orthodox range, from CC, ascending from thence to g^3 in altissimo, 56 notes. The pedal board, with the pedal Organ running *throughout*, extends from CCC to tenor F, 30 notes, being the *first* pedal Organ erected in London of this complete compass.

Great, 12 Stops.

1—Double Stopped Diapason	16 feet tone.	7—Fifteenth	2 feet.
		8—Piccolo (wood, open).	2 feet.
2—Open Diapason	8 feet.	9—Sesquialtera, III ranks	1⅗ foot.
3—Stopped Diapason ..	8 feet tone.	10—Mixture.... II ranks	⅘ foot.
4—Principal	4 feet.	11—Trumpet	8 feet.
5—Flute (open, wood)..	4 feet.	12—Clarion	4 feet.
6—Twelfth	2⅔ feet.		

Choir, 10 Stops.

13—Dulciana	8 feet.	18—Flute	4 feet.
14—Viol di Gamba	8 feet.	19—Fifteenth	2 feet.
15—Stopped Diapason, Treble	8 feet tone.	20—Furniture, II ranks	1⅓ foot.
16—Stopped Diapason, Bass	8 feet tone.	21—Bassoon throughout	8 feet.
17—Principal	4 feet.	22—Clarionet and Corno di Bassetto	8 feet tone.

Swell, 12 Stops.

23—Double Dulciana	16 feet.	29—Fifteenth	2 feet.
24—Open Diapason	8 feet.	30—Mixture, III ranks	1⅗ foot.
25—Stopped Diapason	8 feet tone.	31—Double Bassoon	16 feet.
26—Principal	4 feet.	32—Horn	8 feet.
27—Celestina	4 feet.	33—Hautboy	8 feet.
28—Twelfth	2⅔ feet.	34—Clarion	4 feet.

Pedal, 3 Stops.

35—Open Diapason	16 feet.	37—Trombone (metal)	16 feet.
36—Stopped Diapason	16 feet tone.		

Accessory Stops, Movements, &c.

1—Swell to Great.	4—Choir to Pedal.
2—Swell to Choir.	5—Pedal Octave.
3—Great to Pedal.	6, 7, 8—Three Composition Pedals.

188. St. Gabriel's Church, Pimlico.

The Organ recently erected in St. Gabriel's Church, Pimlico, was built by Bevington, from a Specification prepared by Mr. Brownsmith, Organist to the Church. It contains 32 Draw Stops, commanding the Sounding Stops, and 6 Couplers. The following is a list of its contents:

Great, 11 Stops.

	Pipes.		Pipes.
1—Open Diapason	59	7—Fifteenth	59
2—Open Diapason	59	8—Sesquialtera	177
3—Stop Diapason	59	9—Mixture	118
4—Principal	59	10—Trumpet	59
5—Flute	59	11—Clarion	59
6—Twelfth	59		826

Swell, 11 Stops.

12—Double Diapason, Bass 13—Double Diapason, Treble	47	18—Flute	47
14—Open Diapason	47	19—Mixture	94
15—Dulciana	47	20—Horn	47
16—Stop Diapason	47	21—Oboe	47
17—Principal	47	22—Clarion	47
			517

Choir, 8 Stops.

23—Dulciana	47	28—Fifteenth	59
24—Stop Diapason	59	29—Bassoon 30—Cremona	59
25—Principal	59		
26—Flute, Bass 27—Flute, Treble	59		342

Pedal, 2 Stops.

31—Open Diapason to CCC, 16 feet length	20	32—Trombone to CCC, 16 feet length	20
			40

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Octave down, Choir to Great.
3—Octave up, Great.
4—Octave down, Choir.
5—Pedals to Great.
6—Pedals to Choir.
7 to 11—Five Composition Pedals.

Compass.

Great, GG, with GG♯, up to f^3 in alt.
Choir, GG, with GG♯, up to f^3 in alt.
Swell Organ, Gamut G, up to f^3 in alt.
Swell Clavier, down to GG, acting on Choir Organ below Gamut G.
Pedal Organ, Gamut G down to CCC, 16 feet length, then repeating.
Pedal Clavier, GG to Fiddle g, two octaves.

The Organ is enclosed in a Gothic Screen Case of solid oak, with gilt Speaking Pipes, designed by Thomas Cundy, Esq. the architect of the Church.

189. Holy Trinity, Brompton.

This Organ was built by Messrs. Flight and Robson, in 1829; since then, Mr. Robson has considerably enlarged the Swell Organ, by adding new Stops, &c. The instrument now contains 23 Stops.

Great, 8 Stops.

1—Open Diapason.
2—Great Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera.
8—Trumpet.

Choir, 4 Stops.

9—Stopped Diapason.
10—Dulciana.
11—Principal.
12—Cremona.

Swell, 10 Stops.

13—Double Open Diapason.
14—Open Diapason.
15—Stopped Diapason.
16—Claribel-Flute.
17—Echo Dulciana.
18—Principal.
19—Fifteenth.
20—Sesquialtera.
21—Oboe.
22—Horn.

Pedal, 1 Stop.

23—An Octave of Pedals and Pedal Pipes.

Couplers, &c.

1—Swell to Great.
2—Swell and Choir to Great.
3—Octave Coupler to Swell.
4—Pedals to Great.
5—Pedals to Choir.
6, 7, 8—Three Composition Pedals.

190. St. Luke's, Chelsea.

The Organ in St. Luke's, Chelsea, was built by Nichols, but completed and erected by Gray. It contains 34 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Open Diapason.
2—Open Diapason
3—Open Diapason.
4—Stopped Diapason.
5—Clarabella.
6—Principal.
7—Principal
8—Twelfth.
9—Fifteenth.
10—Fifteenth.
11—Tierce.
12—Sesquialtera
13—Trumpet.
14—Clarion.

Swell, 12 Stops.

15—Open Diapason.
16—Open Diapason.
17—Stopped Diapason.
18—Dulciana.
19—Dulciana.
20—Principal.
21—Principal.
22—Flute.
23—Cornet.
24—Trumpet.
25—Hautboy.
26—Clarion.

Choir, 6 Stops.

27—Dulciana.
28—Stopped Diapason.
29—Principal.
30—Flute.
31—Fifteenth.
32—Cremona.

Pedal, 1 Stop.

33—Open Pedal Pipes from Gamut G down to CCC, 16 feet length; then repeating below.

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Great to Pedal.
3—Choir to Pedal.
4, 5, 6—Three Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, to Fiddle g only, $2\frac{2}{3}$ feet compass.
Pedal Clavier, GG to Fiddle g, two octaves.

191. St. John's, Waterloo Road.

This Organ was built by Bishop, and presented to the Church by Thomas Lett, Esq. in 1824. It has 3 Manuals and Pedal, and 26 Sounding Stops. Compass of Great and Choir, GG to f_3 in alt; Swell, to Gamut G.

Great, 10 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Mixture, .. II ranks.
9—Trumpet.
10—Clarion.

Choir, 7 Stops.

11—Dulciana.
12—Stopped Diapason.
13—Principal.
14—Fifteenth.
15—Flute.
16—Cremona, Treble.
17—Bassoon, Bass.

Swell, 7 Stops.

18—Open Diapason.
19—Stopped Diapason.
20—Dulciana.
21—Principal.
22—French Horn.
23—Trumpet.
24—Hautboy.

Pedal, 2 Stops.

25—Double Open Pipes to CCC, then Unisons to the bottom.
26—Trombone, 7 Pipes FFF♯ to CCC.

Accessory Stops, Movements, &c.

1—Great to Swell.
2—Great to Pedal.
3—Choir to Pedal.
4 to 7—Four Composition Pedals.

192. St. Peter's, Walworth.

A fine Organ, built by Lincoln about 1826, containing 27 Stops.

Great, 11 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Tierce.
8—Sesquialtera.
9—Mixture.
10—Trumpet.
11—Clarion.

Choir, 8 Stops.

12—Open Diapason.
13—Stopped Diapason.
14—Dulciana.
15—Principal.
16—Flute.
17—Fifteenth.
18—Cremona.
19—Bassoon.

Swell, 7 Stops—to Tenor C.

20—Open Diapason.
21—Stopped Diapason.
22—Double Diapason.
23—Principal.
24—Hautboy.
25—Trumpet.
26—Clarion.

Pedal, 1 Stop.

27—Unison Open Pedal Pipes to GG.

Couplers.

Choir to Great.
Pedals to Great.
Pedals to Choir.

193. St. George's, Camberwell.

This Church has a fine Organ, built by Lincoln, containing 25 Stops.

Great, 11 Stops.

1—Double Diapason.
2—Open Diapason.
3—Open Diapason.
4—Stopped Diapason.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, V ranks.
9—Mixture, . . IV ranks.
10—Trumpet.
11—Clarion.

Choir, 6 Stops.

12—Dulciana.
13—Stopped Diapason.
14—Principal.
15—Flute.
16—Fifteenth.
17—Cromorne and Bassoon.

Swell, 7 Stops.

18—Dulciana.
19—Stopped Diapason.
20—Open Diapason.
21—Principal.
22—Cornet.
23—Trumpet.
24—Hautboy.

Pedal, 1 Stop.

25—Open Pipes to CCC.

194. St. Giles, Camberwell.

The Organ at this Church was built by Mr. J. C. Bishop, in 1844, from a specification prepared by Dr. S. S. Wesley. It contains 41 Sounding Stops.

Great, 14 Stops.

1—Open Diapason	8 feet.	8—Fifteenth	2 feet.
2—Open Diapason	8 feet.	9—Sesquialtera, III rnks.	
3—Open Diapason, wood, large	8 feet.	10—Mixture, .. III rnks.	
4—Claribella	8 feet.	11—Furniture, .. II rnks.	
5—Principal	4 feet.	12—Doublette, .. II rnks.	
6—Principal	4 feet.	13—Trumpet.....	8 feet.
7—Twelfth	$2\frac{2}{3}$ feet.	14—Clarion	4 feet.

Choir, 10 Stops.

15—Open Diapason, metal throughout	8 feet.	19—Principal	4 feet.
16—Dulciana, metal throughout	8 feet.	20—Flute	4 feet.
		21—Fifteenth	2 feet.
		22—Mixture, II ranks..	$1\frac{1}{3}$ feet.
17—Stopped Diapason ..	8 feet tone.	23—Cremona.....	8 feet tone.
18—Claribella.....	8 feet.	24—Bassoon.....	8 feet.

Swell, 14 Stops.

25—Bourdon	16 feet tone.	32—Sesquialtera, III rnks,	$1\frac{1}{3}$ foot.
26—Double Diapason....	16 feet.	33—Mixture, .. II rnks.	$\frac{2}{3}$ foot.
27—Open Diapason	8 feet.	34—Doublette, .. II rnks.	2 feet.
28—Open Diapason	8 feet.	35—Horn	8 feet.
29—Stopped Diapason ..	8 feet tone.	36—Trumpet.....	8 feet.
30—Principal.....	4 feet.	37—Hautboy.....	8 feet.
31—Fifteenth	2 feet.	38—Clarion.....	4 feet.

Pedal, 3 Stops.

39—Double Diapason	16 feet.	41—Double Trumpet.....	16 feet.
40—Open Diapason (large scale, metal)	8 feet.		

Accessory Stops, Movements, &c.

1—Swell to Pedals.	4—Swell to Great.
2—Great to Pedals.	5—Wood open to Pedals separately.
3—Choir to Pedals.	

6 to 13—Eight Composition Pedals.

195. St. Saviour's, Southwark.

The Organ in St. Saviour's Church, Southwark, possesses a fine bold tone, and, until recently, was enclosed in a splendid case, with the 16-feet metal Double Diapason in front. The instrument was built in the year 1703, and has been attributed to Schrider and to Schwarbrook; but the work appears more like that of Harris. The Great and Choir Organs were originally "short Octave, GG," and ascended to e^3 in alt; the Swell to Fiddle g was a subsequent addition, having been made by Byfield. In 1818, the Organ was considerably enlarged by Davis, who made the Great and Choir Organs "long Octaves," and added the f^3 in alt above. The Swell was extended to Tenor c; an Octave and a half of G Pedals were laid down; a similar compass of GGG Pedal Pipes applied; a Swell and two Pedal Couplers were also introduced.

Subsequently, Mr. Bishop put in a Cremona in place of the Vox Humana in the Choir Organ; a Clarabella in the room of the 5-rank Cornet in the Great Organ; a new Twelfth and Fifteenth; and a Pedal Octave Coupler. In 1841, the Organ was removed from its previous position between the Transepts, to the west end of the new Nave, just then rebuilt on the site of the old one. The Swell was then extended down to Gamut G, by Bishop, and two Horizontal Bellows provided. At

the same time the magnificent old Case was superseded by the present one, designed and provided by the Architect of the building; and the largest Pipes of the original front were placed inside. The Organ now contains 28 Sounding Stops, of which the following is a list:

Great, 13 Stops.

1—Double Open Diapason.
2—Open Diapason.
3—Open Diapason.
4—Stopped Diapason.
5—Clarabella.
6—Principal.
7—Stopped Flute.
8—Twelfth.
9—Fifteenth.
10—Sesquialtera, IV ranks.
11—Furniture,..III ranks.
12—Trumpet.
13—Clarion.

Choir, 7 Stops.

14—Open Diapason.
15—Stopped Diapason.
16—Principal.
17—Stopped Flute.
18—Fifteenth.
19—Mixture, III ranks.
20—Cremona.

Swell, 7 Stops.

21—Open Diapason.
22—Stopped Diapason.
23—Principal.
24—Sesquialtera, III ranks.
25—Trumpet.
26—Oboe.
27—Clarion.

Pedal, 1 Stop.

28—Open Wood Pipes, CC to Gamut GGG...21⅓ feet length.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f_3 in alt.
Swell Gamut G to f^3 in alt.
Pedal, GG to Tenor c.

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Choir to Great.
3—Great to Pedal.
4—Choir to Pedal.

196. St. Olave's, Southwark.

"This Organ, of a 32-feet Manual Gamut, was designed by H. J. Gauntlett, commenced by Mr. Lincoln, 1844, and perfected by Mr. William Hill, 1846." The foregoing inscription appears on a brass plate between the Manuals. The Organ at St. Olave's contains 40 Sounding Stops, of which the following is a list:

Great, 27 Stops.

1—Sub Bourdon, to Tenor c key ..... 32 feet.
2—Tenoroon, to Tenor c key..... 16 feet.
3—Bourdon ..... 16 feet tone.
4—Unison, open ..... 8 feet.
5—Unison Treble, closed. 8 feet tone.
6—Unison Bass, closed.. 8 feet tone.
7—Viol di Gamba, to Tenor c ..... 8 feet.
8—Salcional, to Tenor c.. 8 feet.
9—Clarabella, to Tenor c. 8 feet.
10—Quint..... 6 feet.
11—Octave ..... 4 feet.
12—Wald Flute, to Tenor c..... 4 feet.
13—Decima ..... 3½ feet.
14—Duo Decima ..... 3 feet.
15—Super Octave ..... 2 feet.
16—Piccolo, to Tenor c .. 2 feet.
17—Octave Decima .... 1¾ foot.
18—Sesquialtera, III ranks.
19—Mixture, .. II ranks.
20—Furniture,..III ranks.
21—Doublette,.. II ranks.
22—Glockenspiel, II ranks.
23—Posaune ..... 8 feet.
24—Clarion ..... 4 feet.
25—Octave Clarion..... 2 feet.
26—Cromhorn to Tenor c.. 8 feet tone.
27—Corno Flute to Tenor c. 8 feet.

Swell, 10 Stops.

28—Tenoroon..... 16 feet.
29—Unison Open ..... 8 feet.
30—Unison Closed ..... 8 feet tone.
31—Octave..... 8 feet.
32—Suabe Flute..... 4 feet.
33—Super-octave ..... 2 feet.
34—Flageolet..... 2 feet.
35—Octave Fifteenth... 1 foot.
36—Cornopean ..... 8 feet.
37—Hautbois..... 8 feet.

Pedal, 3 Stops.

38—Contra Bourdon ... 32 feet tone.
39—Principal Contra Bass. 16 feet.
40—Bass Trombone .... 16 feet.

Couplers, &c.

1—Grand Organ combined.
2—Swell to Grand.
3—Grand to Pedal.
4—Swell to Pedal.

Compass.

Great, CC to f^3 in alt.
Swell, Tenor c to f^3 in alt.
Pedal, CCC to Tenor d.

The Great Organ has two separate sound-boards, which accounts for the Coupler denominated "Grand Organ combined."

197. St. John's, Southwark.

This Organ was built by Cranz and Hancock in 1770, and enlarged by J. Walker in 1844. It has 27 Sounding Stops, of which the following is a list:

Great, 11 Stops.

1—Large Open Diapason.
2—Small Open Diapason.
3—Open Diapason, treble.
4—Stopped Diapason.
5—Principal.
6—Twelfth.
7—Fifteenth
8—Sesquialtera.
9—Mixture.
10—Trumpet.
11—Clarion.

Choir, 5 Stops.

12—Stopped Diapason.
13—Principal.
14—Flute.
15—Fifteenth.
16—Cremona.

Swell, 10 Stops.

17—Double Diapason.
18—Open Diapason.
19—Stopped Diapason.
20—Dulciana.
21—Principal.
22—Fifteenth.
23—Sesquialtera.
24—Horn.
25—Hautboy.
26—Clarion.

Pedal, 1 Stop.

27—Open wood Pipes to CCC..16 feet length.

Couplers.

Pedals to Choir Organ.
Pedals to Great Organ.
Great Organ to Swell.

Compass.

Great, GG to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Gamut G to e^3 in alt.
Pedal Clavier to GG.

198. St. James's, Bermondsey.

This Organ was built by Bishop, in 1829, and contains the following 29 Stops:

Great, 10 Stops.
59 Notes, from GG to F.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Mixture, .. II ranks.
9—Trumpet.
10—Clarion.

Choir, 8 Stops.
59 Notes, from GG to F.

11—Open Diapson.
12—Stopped Diapason.
13—Dulciana, from Gamut G.
14—Principal.
15—Flute.
16—Fifteenth.
17—Cremona, treble.
18—Bassoon, bass.

Swell, 8 Stops.
47 Notes, from Gamut G to F, with keys continued to GG, acting on the Choir Organ.

19—Open Diapason.
20—Open Diapason.
21—Stopped Diapason.
22—Principal.
23—Cornet (originally 12th, 15th, and Sesquialtera; now unfortunately only 12th and 15th).
24—French Horn.
25—Trumpet.
26—Hautboy.

Pedal, 3 Stops.

27—Double Diapason, 25 Notes, from GGG—21⅓ feet length.
28—Unison..... Ditto ..... GG—10⅔ feet length.
29—Trombone..... Ditto ..... GG—10⅔ feet length.

Copulas.

1—Swell to Great.
2—Swell to Choir.
3—Great to Choir.
4—Pedals to Great.
5—Pedals to Choir.

Composition Pedals, &c.

1—Full.
2—Full, without Reeds.
3—Diapasons.
4—Shifting Movement for shutting off all the Swell but the Diapasons.
5—Pedal for coupling Swell to Great.

There is a Key-board at the side, by means of which a second performer can play the Pedals.

199. St. Mary's, Rotherhithe.

This Organ was built by Byfield, in 1764. It then contained two rows of keys, from GG to E, short octaves, and a Swell from Fiddle G to E. It has been since altered by Russell, of Gray's Inn Lane, who removed the Nason and Cornet from the Great Organ, and introduced an Open Diapason. He also added an Open Diapason to the Swell, and substituted a Cremona for the Vox Humana in the Choir Organ, with long Octaves, and an Octave and a half of Pedals, but without separate Pedal Pipes. The Organ now contains 20 Stops, of which the following is a list:

Great, 9 Stops—GG to F.

1—Open Diapason.....	58 pipes.	6—Fifteenth.....	58 pipes.
2—Open Diapason.....	58 pipes.	7—Sesquialtera.....	174 pipes.
3—Stopped Diapason	58 pipes.	8—Trumpet	58 pipes.
4—Principal.....	58 pipes.	9—Clarion	58 pipes.
5—Twelfth	58 pipes.		
			638

Choir, 5 Stops—GG to F.

10—Stopped Diapason	58 pipes.	13—Fifteenth.....	58 pipes.
11—Principal.....	58 pipes.	14—Cremona to C	42 pipes.
12—Flute.....	58 pipes.		
			274

Swell, 9 Stops—Fiddle G to E.

15—Open Diapason	34 pipes.
16—Open Diapason	34 pipes.
17—Stopped Diapason	34 pipes.
18—Principal.....	34 pipes.
19—Hautboy	34 pipes.
20—Trumpet	34 pipes.

Total number of Pipes.

Swell Organ.....	204 pipes.
Choir Organ.....	274 pipes.
Great Organ	638 pipes.
	1116

200. Greenwich.

The Organ in the Chapel of the Royal Hospital, at Greenwich, is a most admirable specimen of Green's work. It cost £1,000, exclusive of the case, and contains the following 26 Stops:

Great, 12 Stops.

1—Open Diapson	8—Fifteenth.
2—Open Diapason.	9—Sesquialtera, III ranks.
3—Stopped Diapason.	10—Mixture....III ranks.
4—Clarabella, in lieu of IV-rank Cornet.	11 { Trumpet, Treble. / Trumpet, Bass.
5—Principal.	
6—Metal Flute.	12—Clarion.
7—Twelfth.	

Choir, 5 Stops.

13—Stopped Diapason.	16—Fifteenth.
14—Principal.	17—Cremona.
15—Flute.	

Swell, 8 Stops.

18—Open Diapason.	22—Dulciana Principal.
19—Dulciana.	23—Cornet, III ranks, 12, 15, 17.
20—Stopped Diapason.	24—Hautboy.
21—Principal.	25—Trumpet.

Pedal, 1 Stop.

26—Open Diapason, CC down to CCC; then return BB to FFF.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	3—Coupler, Great to Pedal.
2—Coupler, Choir to Great.	4—Coupler, Choir to Pedal.

Compass.

Great, FFF to e^3 in alt; no FFF♯.	Swell, FF to e^3 in alt; keys below FF acting.
Choir, FFF to e^3 in alt; no FFF♯.	

Pedal Clavier, FFF to Tenor c.

201. Lee Church, Kent.

This fine Organ was built by Bishop, in 1850. It has 29 Sounding Stops, of which the following is a list:

Great, 9 Stops.

1—Open Diapason	8 feet.	6—Fifteenth	2 feet.
2—Stopped Diapason ..	8 feet tone.	7—Sesquialtera, III ranks.	
3—German Flute	8 feet.	8—Mixture.... II ranks.	
4—Principal	4 feet.	9—Trumpet	8 feet.
5—Twelfth	$2\frac{2}{3}$ feet.		

Choir, 8 Stops.

10—Open Diapason	8 feet.	14—Principal	4 feet.
11—Dulciana	8 feet.	15—Flute	4 feet.
12—Stopped Diapason ..	8 feet tone.	16—Fifteenth	2 feet.
13—Viol di Gamba	8 feet.	17—Cremona	8 feet tone.

Swell, 10 Stops.

18—Bourdon, bass.....	16 feet tone.	23—Twelfth	$2\frac{2}{3}$ feet.
19—Tenoroon	16 feet.	24—Fifteenth	2 feet.
20—Open Diapason	8 feet.	25—Sesquialtera, III ranks.	
21—Stopped Diapason ..	8 feet tone.	26—Horn	8 feet.
22—Principal	4 feet.	27—Hautboy	8 feet.

Pedal, 2 Stops.

28—Open Diapason	16 feet.	29—Stopped Diapason ..	16 feet tone.

Couplers, &c.

1—Pedals to Choir Organ.	5—Swell to Great.
2—Ditto to Great Organ.	6—Choir to Great.
3—Ditto to Swell.	7 to 13—Seven Composition Pedals, viz
4—Swell to Choir.	3 to Great Organ, 4 to Swell.

Compass.

All the Manuals, CC to f^3 in alt.	Pedal, CCC to Tenor c.

202. St. Mary's, Clapham.

This Organ was built by Mr. J. C. Bishop, in 1845. It has three complete rows of keys, from CC to F, and 28 Sounding Stops.

Great, 8 Stops.

1—Open Diapason	8 feet.	6—Twelfth	$2\frac{2}{3}$ feet.
2—Stopped Diapason ..	8 feet tone.	6—Fifteenth	2 feet.
3—German Flute	8 feet.	7—Sesquialtera, III ranks.	
4—Principal	4 feet.	8—Trumpet	8 feet.

Choir, 9 Stops.

9—Open Diapason	8 feet.	14—Flute	4 feet.
10—Dulciana	8 feet.	15—Fifteenth	2 feet.
11—Stopped Diapason ..	8 feet tone.	16—Clarionet	8 feet tone.
12—Claribella	8 feet.	17—Double Diapason, bass	16 feet tone.
13—Principal	4 feet.		

Swell, 10 Stops.

18—Open Diapason.....	8 feet.	23—Sesquialtera, III ranks.	
19—Stopped Diapason ..	8 feet tone.	24—Mixture.... II ranks.	
20—Principal	4 feet.	25—Horn	8 feet.
21—Twelfth	$2\frac{2}{3}$ feet.	26—Hautboy	8 feet.
22—Fifteenth.....	2 feet.	27—Clarion.....	4 feet.

Pedal, 1 Stop.

28—Open Diapason ..... 16 feet.

Accessory Stops, Movements, &c.

1—Swell to Pedal.
2—Great to Pedal.
3—Choir to Pedal.
4—Swell to Great.
5—Choir to Great.
6—Swell to Choir.
7—Swell to Great, octave higher.
8, 9, 10—Three Composition Pedals to Great.
11, 12, 13—Three Ditto Ditto to Choir.

Compass.

Great, CC to f^3 in alt.
Choir, CC to f^3 in alt.
Swell, CC to f^3 in alt.
Pedal, CCC to Tenor c.

203. Croydon Church.

This Organ was built in 1794, by Avery, and enlarged and improved by Messrs. Elliott and Hill, in 1819. One of the Open Diapasons originally acted to Gamut G only upon the keys, the last octave being upon the Pedals; but Elliott attached the whole Stop to the Great Organ, and added a regular set of an octave and a half of Pedal Pipes in place of the other Pipes of shorter compass. He likewise put in a Coupler to unite the Choir to Great Manual. The Organ now contains 24 Stops, of which the following is a list:

Great, 11 Stops—GG to F in alt.

1—Open Diapason, front.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Flute.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, III ranks.
9—Mixture .... II ranks.
10—Cornet ..... V ranks.
11—Trumpet.

Choir, 6 Stops.

12—Dulciana to Gamut G.
13—Stopped Diapason.
14—Principal.
15—Flute.
16—Fifteenth.
17—Furniture, II ranks.

Swell, 6 Stops—3 Octaves.

18—Open Diapason.
19—Stopped Diapason.
20—Principal.
21—Cornet, III ranks.
22—Trumpet.
23—Hautboy.

Pedal, 1 Stop.

24—Diapason .... $10\frac{2}{3}$ feet.

Couplers.

1—Pedals to Great. | 2—Pedals to Choir. | 3—Great to Choir.

204. Hampton Court Palace.

The Organ in the Chapel Royal, Hampton Court Palace, is a most excellent and interesting little instrument, built by Father Smith. It has been enlarged and much improved by Hill, who added the Pedal Pipes, and also a Cremona to the Choir Organ. The Organ now contains 20 Sounding Stops, of which the following is a list:

Great, 9 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Flute *(Quintaton)*.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, III ranks.
8—Cornet .... III ranks.
9—Trumpet.

Choir, 5 Stops.

10—Stopped Diapason.
11—Principal.
12—Flute.
13—Fifteenth.
14—Cremona.

Swell, 5 Stops.

15—Open Diapason.
16—Stopped Diapason.
17—Principal.
18—Hautboy.
19—Trumpet.

Pedal, 1 Stop.

20—Open Pipes, Gamut G down to CCC, 16 feet length; repeating on lowest ½ octave of Pedal.

Couplers.

1—Swell to Great. | 2—Great to Pedal. | 3—Choir to Pedal.

Compass.

Great, GG to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Tenor f to f^3 in alt.
Pedal Stop, CCC to Gamut G.
Pedal Clavier, GG to Fiddle g.

COUNTRY ORGANS.

205. Windsor.

The Organ that was built by Father Smith, in the reign of Charles the First, for St. George's Chapel, Windsor, was, on the completion of the present instrument by Green, presented to Windsor Church by King George the Third. Green's Organ was opened on Sunday, October 17, 1790. It was originally enclosed in a "general Swell;" but this was removed many years ago. Considerable additions have been made to the instrument by Gray and Davison, within the last twenty years; among the most important of which may be mentioned the extension of the Swell to FF, together with the introduction of six new Stops; the application of Open Pedal Pipes to FFFF; the substitution of a Mixture and a Clarabella in place of the Furniture and a IV-rank Cornet in the Great Organ, and of a Keraulophon in lieu of the Fifteenth in the Choir. The Organ now contains 33 Sounding Stops, of which the following is a list:

Great, 12 Stops.

1—Open Diapason—Nave Front.
2—Ditto Diapason—Choir Front.
3—Stopped Diapason.
4—Claribella Flute.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, III ranks.
9—Mixture.... II ranks.
10—Trumpet (Treble).
11—Ditto....(Bass).
12—Clarion.

Choir, 7 Stops.

13—Dulciana to FF.	17—Keraulophon.
14—Stopped Diapason.	18—Bassoon.
15—Principal.	19—Clarionet.
16—Octave Flute.	

Swell, 12 Stops.

20—Double Diapason.	26—Fifteenth.
21—Open Diapason.	27—Sesquialtera, III ranks.
22—Stopped Diapason.	28—Cornopean.
23—Dulciana.	29—Hautboy.
24—Dulciana Principal.	30—Trumpet.
25—Principal.	31—Clarion.

Pedal, 2 Stops.

32—Double Open Diapason to FFFF..... 24 ft. length.	33—Open Diapason to FFF ..... 12 ft. length.

Couplers.

Swell to Great.	Choir to Pedals.
Great to Pedals.	Swell to Pedals.

206. Windsor.

The Organ in St. George's Hall, Windsor Castle, was built by Messrs. Hill and Co. It contains 29 Sounding Stops, 2 complete Manuals, and an independent Pedal of 3 Stops. It is also furnished with two sets of Movements, Draw-stops, Claviers, &c. so that it can be used in the Chapel as well as the Hall. The following is a list of the Stops:

Great, 12 Stops.

1—Double Open and Bourdon..... 16 feet.	7—Flute ..... 4 feet.
2—Open Diapason .... 8 feet.	8—Twelfth ..... $2\frac{2}{3}$ feet.
3—Cone Gamba ..... 8 feet.	9—Fifteenth ..... 2 feet.
4—Stopped Diapason .. 8 feet tone.	10—Sesquialtera, III ranks.
5—Quint..... $5\frac{1}{3}$ feet.	11—Posaune ..... 8 feet.
6—Principal ..... 4 feet.	12—Clarion ..... 4 feet.

Choir, 6 Stops.

13—Open Diapason, throughout..... 8 feet.	15—Salicional, to Tenor c . 8 feet.
14—Clarabella and Stopped Bass ..... 8 feet.	16—Gemshorn ..... 4 feet.
	17—Flute ..... 4 feet.
	18—Cromorne ..... 8 feet tone.

Swell, 8 Stops.

19—Double Diapason.... 16 feet.	23—Fifteenth ..... 2 feet.
20—Open Diapason .... 8 feet.	24—Sesquialtera, II ranks.
21—Stopped Diapason .. 8 feet tone.	25—Cornopean ..... 8 feet.
22—Principal ..... 4 feet.	26—Oboe ..... 8 feet.

Pedal, 3 Stops.

27—Open Diapason .... 16 feet.	29—Trombone ..... 16 feet.
28—Principal ..... 8 feet.	

Accessory Stops, Movements, &c.

1—Swell to Great.	2—Great to Pedal.	3—Swell to Pedal.

Compass.

Great, CC to f^3 in alt.	Pedal, CCC to Tenor d.
Swell, CC to f^3 in alt.	

207. Eton College.

The present Organ in Eton College was built by Gray and Davison, in the year 1852. It stands on the floor, and sideways, with its back against the south wall, in nearly the centre of the length of the building. The Case, designed by Mr. Deason, is of oak, and is very handsome. The Pipes, which appear in the front of the case are of polished tin. There are altogether 29 Sounding Stops, of which the following is a list:

Great, 10 Stops—Compass, GG to F in alt.

1—Open Diapason	8 feet.	6—Fifteenth	2 feet.
2—Open Diapason	8 feet.	7—Sesquialtera, III rks.	
3—Stopped Diapason ..	8 feet.	8—Mixture ... III rks.	
4—Principal.....	4 feet.	9—Posaune.....	8 feet.
5—Twelfth	3 feet.	10—Clarion	4 feet.

Choir, 9 Stops—Compass, GG to F in alt.

11—Dulciana	8 feet.	16—Flute.....	4 feet.
12—Keraulophon	8 feet.	17—Fifteenth	2 feet.
13—Clarionette Flute. ..	8 feet.	18—Piccolo	2 feet.
14—StoppedDiapason,Bass	8 feet.	19—Clarionet to Tenor c.	8 feet.
15—Principal	4 feet.		

Swell, 9 Stops—Compass, Tenor C to F in alt.

20—Bourdon	16 feet.	25—Sesquialtera, III rks.	
21—Open Diapason	8 feet.	26—Cornopean.....	8 feet.
22—Stopped Diapason ..	8 feet.	27—Oboe	8 feet.
23—Principal	4 feet.	28—Clarion	4 feet.
24—Fifteenth	2 feet.		

Pedal, 1 Stop.

29—Grand Pedal Open Diapason, to CCC..16 feet length.

The Pedal Clavier descends to GG.

Couplers.

1—Swell to Great.	4—Great to Pedal.
2—Swell to Choir.	5—Choir to Pedal.
3—Choir Sub-octave to Great.	

208. Oxford.

The Organ in Christ Church Cathedral, Oxford, was built by Father Schmidt, in the year 1680, and originally consisted of Great and Choir Organs only. It was enlarged and much improved by Messrs. Gray and Davison, in 1848; who made the Manuals "long octaves," added the Pedal Pipes, &c.

Great, 9 Stops.

1—Open Diapason.	6—Fifteenth.
2—Claribella, in place of IV-rank Cornet.	7—Sesquialtera, III ranks.
3—Stopped Diapason.	8—Mixture,.... II ranks.
4—Principal.	9—Trumpet.
5—Twelfth.	

Choir, 5 Stops.

10—Dulciana.	13—Flute.
11—Stopped Diapason.	14—Cremona.
12—Principal.	

Swell, 6 Stops.

15—Double Diapason.
16—Open Diapason.
17—Stopped Diapason.
18—Principal.
19—Trumpet.
20—Hautboy.

Pedal, 1 Stop.

21—Open Diapason..16 feet.

Couplers.

1—Coupler, Swell to Great.
2—Coupler, Choir to Great.
3—Coupler, Choir to Pedals.
4—Coupler, Great to Pedals.

209. Magdalen College.

The new Organ in Magdalen College Chapel, Oxford, was built by Gray and Davison, and completed in the early part of the present year (1855). It contains 35 Sounding Stops, distributed among 4 Manuals and Pedal in the following manner:

Pedal, 4 Stops.

1—Grand Open Diapason	16 feet.	3—Grand Octave.....	8 feet.
2—Grand Bourdon	16 feet.	4—Grand Trombone ..	16 feet.

Solo, 2 Stops.

5—Flute Harmonique ..	8 feet.	6—Tromba	8 feet.

Great, 10 Stops.

7—Open Diapason.	8 feet.	12—Twelfth	3 feet.
8—Open Diapason.	8 feet.	13—Super-octave	2 feet.
9—Stopped Diapason....	8 feet.	14—Sesquialtera, III rks.	
10—Octave..	4 feet.	15—Mixture .... II rks.	
11—Flute.....	4 feet.	16—Posaune	8 feet.

Choir, 8 Stops.

17—Salcional.....	8 feet.	21—Octave.....	4 feet.
18—Gamba	8 feet.	22—Flute d'Amour.....	4 feet.
19—Stopped Diapason, Bass.....	8 feet.	23—Piccolo..	2 feet.
20—Concert Flute.....	8 feet.	24—Corno di Bassetto. ..	8 feet.

Swell, 11 Stops.

25—Bourdon.....	16 feet.	30—Octave..	4 feet.
26—Open Diapason	8 feet.	31—Super Octave.....	2 feet.
27—Stopped Diapason, Bass	8 feet.	32—Sesquialtera, III ranks	
28—Clarionet Flute	8 feet.	33—Cornopean.....	8 feet.
29—Keraulophon	8 feet.	34—Oboe.....	8 feet.
		35—Clarion.....	4 feet.

Accessory Stops, Movements, &c.

1—Swell to Great Manual.
2—Swell to Choir Manual.
3—Swell Manual to Pedals.
4—Great Manual to Pedals.
5—Choir Manual to Pedals.
6—Choir Sub-octave to Great Manual.
7—Swell to Great Sub-octave.
8—Swell to Great Super-octave.
9—Solo to Swell Manual.
10—Tremulant Swell.
11 to 16—Six Composition Pedals.
17 and 18—Two Pedals for taking on and off the Coupling Stops.
19—Pneumatic Lever attachment.

There are several reservoirs, producing different weights of wind; and the increasing pressure system has been applied to the Great Organ. Tho Solo Organ

is also voiced to a heavy weight of wind. To prevent the numerous Couplers disagreeably affecting the touch, the Pneumatic Apparatus is applied to the Great Organ Manual and all that it affects.

210. Radley.

The Organ in St. Peter's College, Radley, near Oxford, was built by the Messrs. Telford, of Dublin. It consists of 3 complete Manuals, an independent Pedal of 10 Stops, and 47 Sounding Stops, of which the following is a list:

Great, 16 Stops.

1—Double Open Diapason, metal 16 feet.
2—Open Diapason (Great) metal 8 feet.
3—Open Diapason (Small) metal 8 feet.
4—Stopped Diapason, wood 8 feet tone.
5—Quint . . . . . metal . . $5\frac{1}{3}$ feet.
6—Principal (Great) metal 4 feet.
7—Principal (Small) metal 4 feet.
8—Tenth . . . . . metal . . $3\frac{1}{5}$ feet.
9—Twelfth . . . . metal . . $2\frac{2}{3}$ feet.
10—Fifteenth . . . metal . . 2 feet.
11—Octave Flute . wood . . 2 feet.
12—Sesquialtera . . metal . . IV ranks.
13—Mixture . . . . metal . . III ranks.
14—Double Trumpet, metal 16 feet.
15—Trumpet . . . . metal . . 8 feet.
16—Clarion . . . . metal . . 4 feet.

Choir, 8 Stops.

17—Stopped Diapason, wood 8 feet tone.
18—Dulciana . . . . . metal 8 feet.
19—Viol di Gamba . metal 8 feet.
20—Principal . . . . . metal 4 feet.
21—Wald Flute . . . . wood 4 feet.
22—Fifteenth . . . . metal 2 feet.
23—Mixture . . . . . metal $1\frac{1}{3}$ foot.
24—Cremona . . . . . metal 8 feet.

Swell, 13 Stops.

25—Double Diapason, metal and wood . . . . . 16 feet.
26—Open Diapason . . metal 8 feet.
27—Dulciana . . . . . metal 8 feet.
28—Stopped Diapason, wood 8 feet tone.
29—Principal . . . . . metal 4 feet.
30—Principal (Small) metal 4 feet.
31—Twelfth . . . . . metal $2\frac{2}{3}$ feet.
32—Fifteenth . . . . . metal 2 feet.
33—Twenty-second . metal 1 foot.
34—Sesquialtera . . . . metal . III ranks.
35—Cornet (Dulciana) metal . III ranks.
36—Trumpet . . . . . metal 8 feet.
37—Oboe . . . . . metal 8 feet.

Pedal, 10 Stops.

38—Double Double Open Diapason . . . . wood 32 feet.
39—Double Open Diapason, wood 16 feet.
40—Double Open Diapason, metal 16 feet.
41—Open Diapason . metal 8 feet.
42—Principal . . . . metal 4 feet.
43—Twelfth . . . . . metal $2\frac{2}{3}$ feet.
44—Fifteenth . . . . metal 2 feet.
45—Sesquialtera . metal . IV ranks.
46—Double Trumpet, metal 16 feet.
47—Trumpet . . . . . metal 8 feet

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Swell to Choir.
3—Coupler, Swell to Pedal.
4—Coupler, Great to Pedal.
5 to 10—Six Composition Pedals.

Compass.

Great, CC to g^3 in altissimo.
Choir, CC to g^3 in altissimo.
Swell, CC to g^3 in altissimo.
Pedal, CCC to Fiddle g.

211. Gloucester.

The Organ in Gloucester Cathedral was originally built by the elder Harris, in conjunction with his son Renatus, in the year 1670. In 1847, the instrument was considerably enlarged by Henry Willis, of London, who added a Swell of Twelve Stops, all of which are entirely new (with its movement), excepting some old Pipes which were derived from the old Twelfth in the Great Organ and the old Swell. The continuation of the Great Organ from GG to CCC, and the entire re-arrangement of the Pedals and mechanism, including new Couplers, &c. and the addition of a Mixture and Clarion to the Great Organ, are also by Willis. The instrument now contains 29 Sounding Stops, of which the following is a list:

Great, 11 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Clarabella.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, IV ranks.
9—Mixture, .. II ranks.
10—Trumpet.
11—Clarion.

Choir, 5 Stops.

12—Dulciana.
13—Stopped Diapason.
14—Principal.
15—Flute (metal).
16—Fifteenth.

Swell, 12 Stops.

17—Open Diapason.
18—Open Diapason.
19—Stopped Diapason.
20—Dulciana.
21—Principal.
22—Flute.
23—Fifteenth.
24—Sesquialtera.
25—Trumpet.
26—Hautboy.
27—Cremona.
28—Clarion.

Pedal, 1 Stop.

29—Open Diapason.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Choir to Great.
3—Coupler, Swell to Choir.
4—Coupler, Pedals to Great.
5—Coupler, Pedals to Choir.
6—Coupler, Pedal to Great.

Compass.

Great, CCC to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, CC to f^3 in alt.
Pedal, CCC to Tenor e.

212. Gloucester.

The Organ in the Shire Hall, at Gloucester, was built by Nicholson of Worcester, in the year 1849. It contains 36 Sounding Stops, of which the following is a list:

Great, 13 Stops.

1—Double Open Diapason, metal all through ..... 16 feet.
2—Open Diapason, large scale, all metal .. 8 feet.
3—Open Diapason, small scale, all metal .. 8 feet.
4—Stopped Diapason, Treble..... 8 feet tone.
5—StoppedDiapason,Bass 8 feet tone.
6—Viol di Gamba .. .. 8 feet.
7—Principal..... 4 feet.
8—Wald Flute ..... 4 feet.
9—Twelfth ..... $2\frac{2}{3}$ feet.
10—Fifteenth ..... 2 feet.
11—Mixture, II ranks.
12—Trombone ..... 8 feet.
13—Clarion ..... 4 feet.

Choir, 7 Stops.

14—Dulciana, throughout	8 feet.	17—Keraulophon, to Tenor c	8 feet.
15—Stopped Diapason, Treble	8 feet tone.	18—Principal	4 feet.
16—Stopped Diapason, Bass	8 feet tone.	19—Fifteenth	2 feet.
		20—Cremona to Tenor c	8 feet tone.

Swell, 10 Stops.

21—Bourdon	16 feet tone.	26—Sesquialtera, III rnks.	
22—Open Diapason	8 feet.	27—Cornopean	8 feet.
23—Stopped Diapason	8 feet tone.	28—Hautboy	8 feet.
24—Principal	4 feet.	29—Clarion	4 feet.
25—Fifteenth	2 feet.	30—Cromorne, throughout	8 feet tone.

Pedal, 6 Stops.

31—Open Diapason, large	16 feet.	34—Fifteenth	4 feet.
32—Open Diapason, small	16 feet.	35—Sesquialtera, V ranks.	
33—Principal	8 feet.	36—Posaune	16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Great to Swell.	4—Coupler, Pedal to Great.
2—Coupler, Great to Choir.	5—Coupler, Pedal to Choir.
3—Coupler, Choir to Swell.	6—Coupler, Pedal to Swell.

Compass.

Great, CC to g^3 in altissimo.	Swell, CC to g^3 in altissimo.
Choir, GG to g^3 in altissimo.	Pedal, CCC to Tenor f.

213. Tewkesbury.

Part of the Organ now standing in the Abbey Church of Tewkesbury formed a portion of that which originally stood in Magdalen College, Oxford; whence it was removed to its present locality in 1740, on the completion of Schwarbrook's Organ for the College just mentioned. The Tewkesbury Organ, however, has been entirely remodelled and greatly enlarged by Willis. But little of the original work remains, except a few Diapasons and the Principal, together with the East or Choir front, which, although thin, are valuable, as they are made of tin, alloyed with about eight pounds of lead to the cwt. The Organ contains 22 Stops.

Great, 13 Stops—Compass from CC to F.

1—Open Diapason	8 feet.	8—Fifteenth	4 feet.
2—Open Diapason	8 feet.	9—Sesquialtera.	
3—Stopped Diapason	8 feet tone.	10—Mixture.	
4—Clarabella	8 feet.	11—Trumpet	8 feet.
5—Dulciana	8 feet.	12—Clarion	4 feet.
6—Principal	4 feet.	13—Cremona	8 feet tone.
7—Twelfth	$2\frac{2}{3}$ feet.		

Swell, 7 Stops—from CC to F.

14—Open Diapason	8 feet.	18—Sesquialtera, III rnks.	$1\frac{3}{5}$ foot.
15—Stopped Diapason	8 feet tone.	19—Trumpet (only prepared for).	
16—Principal	4 feet.	20—Hautboy	8 feet.
17—Fifteenth	2 feet.		

Pedal, 2 Stops—Two octaves and a major third, from CCC to E.

21—Double Open Diapason 16. feet.	22—Double Trumpet 16 feet.

Couplers.

1—Swell to Great	3—Great to Pedal.
2—Swell to Pedals.	

214. Hereford.

The Organ in Hereford Cathedral, originally built by Father Smith, in 1686, was a present from King Charles the Second. Byfield afterwards added the Choir Organ; and the instrument has since been successively repaired by Snetzler, Green, Avery, Lincoln, Elliott, who in 1806 put Pedals and Pedal Pipes; and, lastly, by Bishop, who introduced the present Swell and Pedal Pipes. The instrument has now 24 Sounding Stops, of which the following is a list:

Great, 12 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Clarabella, in place of V-rank Cornet.
5—Principal.
6—Principal.
7—Twelfth.
8—Fifteenth.
9—Tierce.
10—Larigot.
11—Sesquialtera, III ranks.
12—Trumpet.

Choir, 6 Stops.

13—Stopped Diapason.
14—Dulciana.
15—Principal.
16—Flute.
17—Fifteenth.
18—Cremona.

Swell, 5 Stops, to Tenor c.

19—Open Diapason.
20—Stopped Diapason.
21—Principal.
22—Trumpet.
23—Hautboy.

Pedal, 1 Stop, CCC to Tenor d.

24—Open Diapason, wood..16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Choir to Pedal.
4, 5, 6—Three Composition Pedals.

215. Worcester.

The present Organ in Worcester Cathedral was built by Messrs. Hill and Co. in the year 1842, and is one of the largest Cathedral Organs in England, except that at York Minster. It contains 39 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Tenoroon ..... 16 feet.
2—Bourdon, to meet No. 1 16 feet tone.
3—Open Diapason, Back 8 feet.
4—Open Diapason, Front 8 feet.
5—Stopped Diapason .. 8 feet tone.
6—Quint..... $5\frac{1}{3}$ feet.
7—Principal..... 4 feet.
8—Wald-Flöte..... 4 feet.
9—Twelfth ..... $2\frac{2}{3}$ feet.
10—Fifteenth ..... 2 feet.
11—Sesquialtera, III rnks. $1\frac{3}{5}$ foot.
12—Mixture, .. II ranks $\frac{2}{3}$ foot.
13—Doublette,.. II ranks 2 feet.
14—Posaune..... 8 feet.

Choir, 8 Stops.

15—Dulciana..... 8 feet.
16—Clarabella ..... 8 feet.
17—Stopped Diapason... 8 feet tone.
18—Principal ..... 4 feet.
19—Stopped Flute..... 4 feet tone.
20—Oboe Flute..... 4 feet.
21—Fifteenth ..... 2 feet.
22—Cremona ..... 8 feet tone.

Swell, 11 Stops.

23—Double Dulciana....	16 feet.	29—Flageolet	4 feet.
24—Open Diapason.....	8 feet.	30—Doublette, II ranks..	2 feet.
25—Stopped Diapason. ..	8 feet tone.	31—Echo Cornet.	
26—Dulciana.....	8 feet.	32—Oboe	8 feet.
27—Principal.....	4 feet.	33—Cornopean	8 feet.
28—Suabe-Flute.....	4 feet.		

Pedal, 6 Stops.

34—Open Diapason	16 feet.	37—Fifteenth	4 feet.
35—Stopped Diapason ..	16 feet tone.	38—Sesquialtera, V ranks.	
36—Principal.	8 feet.	39—Trombone	16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	4—Coupler, Pedals to Choir.
2—Coupler, Swell to Choir.	5 to 9—Five Composition Pedals.
3—Coupler, Pedals to Great.	

Compass.

Great, CC to f^3 in alt.	Swell, Tenor c to f^3 in alt.
Choir, CC to f^3 in alt.	Pedal, CCC to Tenor e.

216. Worcester.

The Organ in the Shire Hall at Worcester was built in 1844, by Nicholson of that City. It contains 53 Sounding Stops, of which the following is a list:

Great, 15 Stops.

1—Great Diapason, metal throughout	16 feet.	9—Wald Flute.....	4 feet.
		10—Twelfth.....	$2\frac{2}{3}$ feet.
2—Open Diapason	8 feet.	11—Fifteenth	2 feet.
3—Open Diapason, small	8 feet.	12—Tierce.....	$1\frac{3}{5}$ foot.
4—Gamba	8 feet.	13—Mixture .. V ranks.	2 feet.
5—Bourdon.....	8 feet tone.	14—Posaune	8 feet.
6—Quint.....	$5\frac{1}{3}$ feet.	15—Clarion	4 feet.
7—Octave.....	4 feet.	16 a—Spare Slider.	
8—Gemshorn	4 feet.		

Swell, 15 Stops.

16—Great Diapason, open throughout.....	16 feet.	24—Super-octave.....	2 feet.
		25—Mixture, .. V ranks.	
17—Open Diapason	8 feet.	26—Trombone.....	16 feet.
18—Gamba.....	8 feet.	27—Cornopean	8 feet.
19—Stopped Diapason ..	8 feet tone.	28—Hautboy	8 feet.
20—Keraulophon.....	8 feet.	29—Clarionette	8 feet tone.
21—Octave	4 feet.	30—Clarion	4 feet.
22—Gambette.....	4 feet.	31a—Spare Slider.	
23—Wald Flute	4 feet.		

Choir, 11 Stops.

31—Open Diapason	8 feet.	37—Dulcet.....	4 feet.
32—Viol di Gamba	8 feet.	38—Suabe Flute	4 feet.
33—Dulciana.....	8 feet.	39—Octave Flute	2 feet.
34—Clarabella.....	8 feet.	40—Echo Cornet, V ranks.	
35—Stopped Diapason ..	8 feet tone.	41—Trumpet	8 feet.
36—Harmonic Flute	4 feet.	42 a—Spare Slider.	

Pedal, 11 Stops.

42—Great Diapason, open, wood . . . . . 32 feet.
43—Open Diapason . . . . 16 feet.
44—Open Diapason, small, wood . . . . . 16 feet.
45—Dulciana, metal . . . . 16 feet.
46—Violon . . . . . 16 feet.
47—Bourdon . . . . . 16 feet tone.
48—Quint, Stopped . . . . $10\frac{2}{3}$ feet tone.
49—Principal . . . . . 8 feet.
50—Bass Flute . . . . . 8 feet tone.
51—Fifteenth . . . . . 4 feet.
52—Mixture, III ranks.
53—Posaune . . . . . 16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Swell to Choir.
3—Coupler, Choir to Great.
4—Coupler, Great to Pedal.
5—Coupler, Choir to Pedal.
6—Coupler, Swell to Pedal.
7—Coupler, Pedal Octave.
8—Coupler, Swell Octave.
9—Pedal Organ off or on.
10—Sforzando Pedal.
11—Tremulant Swell.
12—Pneumatic Lever Attachment.
13 to 22—Ten Composition Pedals.

217. Stratford-on-Avon.

The Organ in the Parish Church at Stratford-on-Avon was built by Hill in 1841, from a Specification prepared by Mr. F. Marshall, of Leamington. It contains 36 Sounding Stops, of which the following is a list:

Great, 18 Stops.

1—Tenoroon Diapason, . 16 feet.
2—Bourdon, to meet No.1 16 feet tone.
3—Principal Diapason . . 8 feet.
4—Stopped Diapason, Treble . . . . . 8 feet tone.
5—Stopped Diapason, Bass 8 feet tone.
6—Dulciana . . . . . 8 feet.
7—Quint . . . . . $5\frac{1}{3}$ feet.
8—Principal Octave . . . . 4 feet.
9—Wald Flute . . . . . 4 feet.
10—Oboe Flute . . . . . 4 feet.
11—Twelfth . . . . . $2\frac{2}{3}$ feet.
12—Fifteenth . . . . . 2 feet.
13—Octave Fifteenth . . . . 1 foot.
14—Sesquialtera . . . . . $1\frac{3}{5}$ foot.
15—Mixture . . . . . $\frac{2}{3}$ foot.
16—Corno Trombone . . . . 8 feet.
17—Corno Clarion . . . . . 4 feet.
18—Cromorne . . . . . 8 feet tone.

Swell, 12 Stops.

19—Tenoroon Diapason . . 16 feet.
20—Bourdon, to meet No.1. 16 feet tone.
21—Principal Diapason . . 8 feet.
22—Stopped Diapason, Treble . . . . . 8 feet tone.
23—Stopped Diapason, Bass 8 feet tone.
24—Principal Octave . . . . 4 feet.
25—Suabe Flute . . . . . 4 feet.
26—Flageolet . . . . . 2 feet.
27—Doublette, II ranks . 2 feet.
28—Echo Dulciana Cornet, V ranks . $1\frac{3}{5}$ foot.
29—Oboe . . . . . 8 feet.
30—Cornopean . . . . . 8 feet.

Pedal, 6 Stops.

31—Open Diapason . . . . 16 feet.
32—Bourdon . . . . . 16 feet tone.
33—Principal . . . . . 8 feet
34—Fifteenth . . . . . 4 feet.
35—Mixture, . . V ranks $3\frac{1}{5}$ feet.
36—Posaune . . . . . 16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Great to Pedal.
3—Swell to Pedal.
4—Octave Pedal.
5 to 7—Three Composition Pedals.

Compass.

Great and Swell, CC to f^3 in alt. | Pedal, CCC to Tenor d.

218. Kidderminster.

The new Organ for the Town Hall at Kidderminster is being built by Messrs. Hill and Co. It is to contain 28 Sounding Stops, of which the following is a list:

Great, 10 Stops.

1—Double Open and Bourdon	16 feet.	6—Wald Flute	4 feet.
2—Open Diapason	8 feet.	7—Twelfth	2⅔ feet.
3—Cone Gamba	8 feet.	8—Fifteenth	2 feet.
4—Stopped Diapason	8 feet tone.	9—Sesquialtera, III rnks.	
5—Principal	4 feet.	10—Posaune	8 feet.

Choir, 6 Stops.

11—Dulciana	8 feet.	14—Flute	4 feet.
12—Stopped Diapason	8 feet tone.	15—Piccolo	2 feet.
13—Gemshorn	4 feet.	16—Cromorne	8 feet tone.

Swell, 8 Stops.

17—Double Diapason	16 feet.	21—Principal	4 feet.
18—Open Diapason	8 feet.	22—Fifteenth	2 feet.
19—Gamba	8 feet.	23—Cornopean	8 feet.
20—Stopped Diapason	8 feet tone.	24—Oboe	8 feet.

Pedal, 4 Stops.

25—Open Diapason	16 feet.	27—Principal	8 feet.
26—Violone	16 feet.	28—Posaune	16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	4—Coupler, Swell to Pedal.
2—Coupler, Great to Pedal.	5, 6, 7—Three Composition Pedals.
3—Coupler, Choir to Pedal.	

Compass.

All the Manuals, CC to g^3 in altissimo.	Pedal, CCC to Tenor d.

219. Birmingham.

The splendid Organ in the Town Hall, Birmingham, was built by Mr. William Hill, of London, and cost about £3,000. The height of the case is forty-feet; it is thirty-five feet wide, and fifteen feet deep. The bellows contains 300 square feet of surface, and upwards of three tons weight upon the bellows are required to give the necessary pressure. The trackers, if laid out in a straight line, would reach above five miles. The principal metal pipe, standing in front of the Organ, is thirty-five feet three inches long, and five feet eight inches in circumference. The largest wood-pipe, CCCC, 32 feet, is twelve feet in circumference, and its interior measurement is two hundred and twenty-four cubic feet. Originally the Great and Choir Organs were of 16-feet compass; but on the occasion of the instrument being remodelled, they were altered to the CC or 8-feet range; the Great being at the same time converted into a "16-feet Manual," in the German acceptation of the term. The Pedal Stops were also increased in number, from four to *fifteen*. The Organ has a *fourth* Manual, in connection with a Combination or Solo Organ, upon which, by an ingenious contrivance, can be played any Stop or Stops out of the Swell or Choir Organs, without interfering with their previous arrangement on their separate Manuals. There are two Octaves and five Notes of Pedals. The timber alone used

in this instrument weighs between twenty and thirty tons; and the metal and other materials employed in its formation raise it to a total weight of at least forty tons.

The Birmingham Organ has 53 Sounding Stops, of which the following is a list:

Great, 19 Stops.

1—Double Open Diapason	16 feet.	12—Sesquialtera, V ranks	
2—Open Diapason	8 feet.	13—Mixture .. V ranks	
3—Open Diapason	8 feet.	14—Fourniture. .V ranks	
4—Open Diapason	8 feet.	15—Contra or Double Trumpet	16 feet.
5—Stopped Diapason ..	8 feet tone.		
6—Quint.....	5⅓ feet tone.	16—Posaune.....	8 feet.
7—Principal..	4 feet.	17—Clarion	4 feet.
8—Principal..	4 feet.	18—Octave Clarion	2 feet.
9—Twelfth.....	2⅔ feet.	19—Great Ophicleide, on a heavy pressure of wind	8 feet.
10—Fifteenth	2 feet.		
11—Doublette, II ranks .	2 feet.		

Swell, 10 Stops.

20—Double Diapason ...	16 feet.	25—Sesquialtera, V ranks	1⅗ foot.
21—Open Diapason	8 feet.	26—Horn.....	8 feet.
22—Stop Diapason.....	8 feet tone.	27—Trumpet	8 feet.
23—Principal..	4 feet.	28—Hautboy	8 feet.
24—Fifteenth	2 feet.	29—Clarion.....	4 feet.

Choir, 9 Stops.

30—Open Diapason	8 feet.	35—Oboe Flute	4 feet.
31—Dulciana	8 feet.	36—Wald Flute	4 feet.
32—Stopped Diapason ..	8 feet tone.	37—Fifteenth	2 feet.
33—Principal	4 feet.	38—Cornopean	8 feet.
34—Flute	4 feet.		

Pedal, 15 Stops.

39—Contra-Open Diapason (metal)	32 feet.	45—Principal	8 feet.
		46—Twelfth	6 feet.
40—Contra-Open Diapason (wood)	32 feet.	47—Fifteenth	4 feet.
		48—Sesquialtera, V rnks.	
41—Open Diapason (metal)	16 feet.	49—Mixture, .. V rnks.	
		50—Contra Posaune....	32 feet.
42—Open Diapason (metal)	16 feet.	51—Posaune.....	16 feet.
		52—Trumpet	8 feet.
43—Open Diapason(wood)	16 feet.	53—Clarion	4 feet.
44—Stopped Diapason ..	16 feet tone.		

Combination or Solo Organ.

Choir, 8 Stops.

1—Open Diapason.	5—Harmonica.
2—Cornopean.	6—Flute.
3—Dulciana.	7—Cremona.
4—Stopped Diapason.	8—Bells.

Swell, 9 Stops.

9—Hautboy.	14—Claribella.
10—Clarion.	15—Principal.
11—Trumpet.	16—Stopped Diapason.
12—Horn.	17—Open Diapason.
13—Fifteenth.	

Accessory Stops, Movements, &c.

1—Swell to Great.	5—Pedals only.
2—Choir to Great.	6—Combination Choir.
3—Pedals to Great.	7—Combination Swell.
4—Pedals to Choir.	8 to 14—Seven Composition Pedals.

Compass.

All four Manuals, CC to f^3 in alt.	Pedal, CCC to Tenor f.

220. Lichfield.

Schwarbrook's Organ that stood in Lichfield Cathedral was removed in 1789, to make way for the present instrument, by Green, which has 23 Sounding Stops.

Great, 11 Stops.

Compass from GG, including GG♯, to E in alt.

1—Open Diapason.	7—Tierce.
2—Open Diapason.	8—Furniture.... II ranks.
3—Stopped Diapason.	9—Sesquialtera..III ranks.
4—Principal.	10—Trumpet.
5—Twelfth.	11—Cornet to middle c^1, IV ranks.
6—Fifteenth.	

Choir, 5 Stops.

12—Stopped Diapason.	15—Flute.
13—Dulciana to Gamut G.	16—Fifteenth.
14—Principal.	

Swell, 7 Stops—down to Fiddle g.

17—Open Diapason.	21—Cornet..III ranks.
18—Stopped Diapason.	22—Trumpet.
19—Dulciana.	23—Hautboy.
20—Principal.	

N. B. No Pedal Pipes.

221. Shrewsbury.

The Organ in St. Mary's, Shrewsbury, is a fine instrument, and was built by Harris and Byfield, in 1729. In 1847, it was enlarged and improved by Gray and Davison, and now contains 23 Sounding Stops.

Great, 8 Stops—From CC to E, 53 Notes.

	Pipes.		Pipes.
1—Open Diapason.....	53	6—Sesquialtera, III ranks ...	147
2—Stopped Diapason	53	7—Mixture.... II ranks ...	65
3—Principal.....	53	8—Trumpet.....	53
4—Twelfth	53		
5—Fifteenth.....	53		530

Choir, 5 Stops.

	Pipes.		Pipes.
9—Stopped Diapason	53	12—Flute	53
10—Dulciana to Tenor C	41	13—Fifteenth	53
11—Principal	53		
			253

Swell, 9 Stops—From Tenor C.

	Pipes.		Pipes.
14—Double Diapason	41	19—Sesquialtera	123
15—Open Diapason	41	20—Hautboy	41
16—Stopped Diapason	41	21—Cornopean	41
17—Principal	41	22—Clarion	41
18—Fifteenth	41		451

Pedal, 1 Stop.

23—Open Diapason, from CCC to D 27

Total number of Pipes.....1261

Couplers.

1—Swell to Great. | 2—Pedals to Great. | 3—Pedals to Choir.

222. Shrewsbury.

The Organ in St. Chad's, Shrewsbury, was built by Gray, in 1794; and enlarged and improved by Gray and Davison, in 1848.

Great, 9 Stops—From CC to F, 54 Notes.

	Pipes.		Pipes.
1—Stopped Diapason	54	5—Principal	54
2—Open Diapason	54	6—Twelfth	54
3—Open Diapason to Tenor c, in place of II-rank Mixture	42	7—Fifteenth	54
		8—Sesquialtera, III ranks	150
		9—Trumpet	54
4—Claribella to Middle c^1, in place of IV-rank Cornet.	30		546

Choir, 8 Stops.

	Pipes.		Pipes.
10—Stopped Diapason, treble 11—Ditto Ditto, bass	54	15—Flute	42
12—Keraulophon	42	16—Cremona	42
13—Dulciana	42	17—Bourdon, CCC to BB	12
14—Principal	54		288

Swell, 9 Stops—From Tenor C.

	Pipes.		Pipes.
18—Double Diapason	42	24—Hautboy	42
19—Stopped Diapason	42	25—Cornopean	42
20—Open Diapason	42	26—Clarion	42
21—Principal	42		462
22—Fifteenth	42		
23—Sesquialtera	126		

Pedal, 1 Stop.

27—Open Diapason, from CCC to E 29

Total number of Pipes..1325

Couplers, &c.

1—Swell to Great.
2—Pedals to Great.
3—Pedals to Choir.
4 to 8—Five Composition Pedals; viz.
3 to the Great Organ,
2 to the Swell.

223. Chester Cathedral.

This Organ was built by Messrs. Gray and Davison, in 1844, and is a very fine one. It contains 36 Sounding Stops, of which the following is a list:

Great, 14 Stops—CC to F.

1—Double Diapason.
2—Open Diapason.
3—Open Diapason.
4—Stopped Diapason.
5—Fifth, stopped.
6—Principal.
7—Flute.
8—Twelfth.
9—Fifteenth.
10—Sesquialtera, III ranks.
11—Furniture .. II ranks.
12—Mixture.... II ranks.
13—Trumpet.
14—Clarion.

Choir, 7 Stops—GG to F.

15—Open Diapason.
16—Dulciana.
17—Stopped Diapason.
18—Principal.
19—Flute.
20—Fifteenth.
21—Clarionet.

Swell, 9 Stops—FF to F.

22—Double Diapason.
23—Open Diapason.
24—Stopped Diapason.
25—Principal.
26—Fifteenth.
27—Sesquialtera, III ranks.
28—Hautboy.
29—Cornopean.
30—Clarion.

Pedal, 6 Stops—CCC to D.

31—Open Diapason ..... 16 feet.
32—Stopped Diapason .... 16 feet.
33—Principal ..... 8 feet.
34—Fifteenth ..... 4 feet.
35—Tierce ..... 3⅕ feet.
36—Sesquialtera, II ranks.

Couplers.

1—Swell to Great.
2—Swell to Choir.
3—Choir to Great.
4—Great to Pedals.
5—Choir to Pedals.

224. Chester.

The Organ in St. John's, Chester, built by Hill, has three rows of keys, from CC, the 8-feet pipe, to F in alt, and a small Pedal Organ of two octaves, from CCC, 16 feet, to C, 4 feet.

Although the Pedal Organ consists of only three Stops, the upper octave, by means of a copula, is connected to the lower octave, thus doubling its power; for instance, the foot being placed on the lowest pedal key, a double Open Diapason pipe of 16 feet, a double Stopped Diapason of 8 feet, a double Trumpet of 16 feet (similar to the one in the Birmingham Organ), and a Trumpet of 8 feet, speak together. Also an Open Diapason of 8 feet, and a Stopped Diapason of 4 feet.

Great, 9 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera, IV ranks, bass.
8—Cornet .... IV ranks, treble.
9—Trumpet.

Choir, 8 Stops.

10—Double Stopped Diapason, bass.
11—Open Diapason.
12—Dulciana.
13—Stopped Diapason, bass.
14—Claribella.
15—Principal.
16—Fifteenth.
17—Cremona.

Swell, 8 Stops—From Tenor C to F.

18—Double Stopped Diapason.
19—Open Diapason.
20—Stopped Diapason.
21—Principal.
22—Fifteenth.
23—Sesquialtera, III ranks.
24—Trumpet.
25—Hautboy.

Pedal, 3 Stops.

26—Double Trumpet ..... 16 feet.
27—Double Stopped Diapason 8 feet.
28—Double Open Diapason, metal ..... 16 feet.

Couplers.

1—Swell to Great.
2—Choir to Great.
3—Pedal keys to Choir.
4—Pedal keys to Great.
5—Octave Copula.

225. Liverpool.

The largest Organ yet constructed in England is that recently erected in the magnificent new Hall (St. George's) at Liverpool. It was built by Mr. Willis, under the direction of Dr. S. S. Wesley, and contains 100 Sounding Stops. The following account of this immense instrument is copied from a description compiled from particulars furnished by Dr. Wesley and Mr. Willis.

The instrument consists of four rows of keys, from G to A, i. e. GG to A in altissimo, 63 notes; and two octaves and a half of Pedals, from C to F, i. e. CCC to F, 30 notes. There are 108 Stops, and 8,000 Pipes, varying in length from 32 feet to 3-8ths of an inch, ten octaves apart.

Great, 25 Stops.

1—Double Diapason.... 16 feet.
2—Open Diapason..... 8 feet.
3—Open Diapason..... 8 feet.
4—Open Diapason..... 8 feet.
5—Open Diapason(wood) 8 feet.
6—Stopped Diapason... 8 feet.
7—Principal..... 4 feet.
8—Principal..... 4 feet.
9—Principal..... 4 feet.
10—Flute..... 4 feet.
11—Twelfth..... 3 feet.
12—Twelfth..... 3 feet.
13—Fifteenth..... 2 feet.
14—Fifteenth..... 2 feet.
15—Doublette, .. II rks.
16—Sesquialtera, VI rks.
17—Mixture,... IV rks.
18—Fourniture, IV rks.
19—Cymbale, .. V rks.
20—Posaune..... 16 feet.
21—Ophicliede..... 8 feet.
22—Trombone..... 8 feet.
23—Trumpet..... 8 feet.
24—Clarion..... 4 feet.
25—Clarion..... 4 feet.

Pedal, 17 Stops.

26—Double Diapason(open, wood)..... 32 feet.
27—Double Diapason(open, metal)..... 32 feet.
28—Open Diapason (wood) 16 feet.
29—Open Diapason(metal) 16 feet.
30—Salcional (open, metal) 16 feet.
31—Bourdon (closed,wood) 16 feet.
32—Principal (wood).... 8 feet.
33—Principal (metal)... 8 feet.
34—Quint..... 6 feet.
35—Fifteenth..... 4 feet.
36—Mixture, III ranks.
37—Fourniture, V ranks.
38—Posaune..... 32 feet.
39—Trombone..... 16 feet.
40—Ophicliede..... 16 feet.
41—Trumpet..... 16 feet.
42—Clarion..... 8 feet.

Solo, 15 Stops.

43—Double Diapason (closed, wood)	16 feet.	50—Corno di Bassetto ..	8 feet.
44—Open Diapason (wood)	8 feet.	51—Harmonic Flute....	4 feet.
45—Stopped Diapason ..	8 feet.	52—Ophicleide	8 feet.
46—Flute (orchestral) ..	4 feet.	53—Trombone	8 feet.
47—Flageolet	2 feet.	54—Trumpet (Harmonic)	8 feet.
48—Oboe (orchestral mid C)	8 feet.	55—Vox Humana.	8 feet.
49—Clarionet (tenor C) ..	8 feet.	56—Bassoon	8 feet.
		57—Contra Fagotto	16 feet.

Swell, 25 Stops.

58—Double Diapason....	16 feet.	71—Piccolo (open, wood)	2 feet.
59—Open Diapason ...	8 feet.	72—Sesquialtera, III rks.	
60—Open Diapason	8 feet.	73—Mixture, .. III rks.	
61—Stopped Diapason. ..	8 feet.	74—Furniture, ..IV rks.	
62—Dulciana.....	8 feet.	75—Trombone	16 feet.
63—Principal.....	4 feet.	76—Contra Hautboy...	16 feet.
64—Principal.....	4 feet.	77—Horn	8 feet.
65—Flute (open, wood)		78—Trumpet.....	8 feet.
66—Flute (closed, wood). .	4 feet.	79—Oboe	8 feet.
67—Twelfth	3 feet.	80—Ophicleide	8 feet.
68—Fifteenth	2 feet.	81—Clarion	4 feet.
69—Fifteenth	2 feet.	82—Clarion	4 feet.
70—Doublette, II ranks.			

Choir, 18 Stops.

83—Double Diapason (closed, wood)....	16 feet.	92—Flute.	
84—Open Diapason	8 feet.	93—Flageolet.	2 feet.
85—Dulciana.....	8 feet.	94—Twelfth	3 feet.
86—Viol di Gamba	8 feet.	95—Fifteenth	2 feet.
87—Claribella.....	8 feet.	96—Mixture, III ranks.	
88—Stopped Diapason ..	8 feet.	97—Cremona.....	8 feet.
89—Dulcimer	4 feet.	98—Trumpet	8 feet.
90—Principal.....	4 feet.	99—Orchestral Oboe (tenor C)	8 feet.
91—Celestiana.		100—Clarion	4 feet.

The Couplers or Mechanical Connexions are:

Swell to Great Organ.	Choir to Pedals.
Choir to Great Organ.	Great to Pedals.
Solo to Great Organ.	Swell to Pedals.
Solo to Choir Organ.	Solo Organ to Pedals.
Great to Swell Organ.	

The grand source of wind is from two immense Bellows, each having three feeders, placed in the vaults below the floor of the Hall. These are blown by a steam-engine, consisting of a pair of oscillating cylinders. There are, besides, twelve other bellows, or reservoirs, each giving its own appropriate pressure of air to those Stops or Pipes which it supplies.

The Pneumatic Lever is applied to each of the Manuals distinctly, and also distinctly or separately to the Manual Couplers. To the Pedal Organ there is a double set of Pneumatic Levers; but the most elaborate use of this power is found in its application to the combination of Stops; here we have it exhibited in a compound form to each Organ individually, and to the whole collectively, where by one opera-

To face page 506.

THE ORGAN, ST. GEORGE'S HALL, LIVERPOOL.

NOTE.—Since the preceding specification was first published (in the Musical Transcript), the following alterations in it have been made. In the Great Organ, a Quint of 6 feet has been substituted for one of the three Principals; and a Tenth has been inserted in lieu of one of the two Twelfths. In the Solo Organ, a Horn of 8 feet occupies the place of the Harmonic Flute of 4 feet (No. 51); the Trumpet (No. 54) is not "Harmonic;" and instead of a Vox Humana (No. 55), there is a Harmonic Trumpet of 4 feet. In the Choir Organ, there is an Octave Gamba in place of the "Dulcimer" (No. 89); and the 4-feet Flute (No. 92) is "Harmonic."

The Trumpet and Clarion in the Pedal Organ (Nos. 41 and 42) are of 8 and 4 feet respectively; and the Orchestral Oboe in the Solo Organ (No. 48) descends to Tenor C.

The above facts have been communicated by Mr. Henry Willis, together with several particulars relating to the mechanism of the instrument, which, however, arrived too late to be inserted in the present edition.

tion the player is enabled to produce a combination of Stops upon the entire instrument at once. This movement appears in a series of six handsome gold-gilt knobs, placed immediately under each set of Manuals, at about two keys' distance from each other, occupying a central position, always within reach of one or other of the performer's thumbs.

The Pneumatic Lever is also applied to the opening and shutting of the Swell louvres, and some other less important purposes.

The very extensive use Mr. Willis has made of this extraordinary power seems to have rendered any deviation from the ordinary valves, in immediate connection with the Pipes, unnecessary, excepting in the Pedal Organ, where the large Pipes have a very peculiar valve for their supply, which is quiet, sound, and free from the resistance resulting from the compressed air. Space, however, will not permit us to describe this curious mechanism.

The Pedal-board is a most ingenious contrivance of Dr. Wesley's. The Pedals radiate to a point some distance behind the player, when seated at the instrument; and are circular on plan, and conically segmental in elevation.

The mode of drawing the Stops is different from most Organs that we have seen—each knob, which is of solid ivory, presenting itself at an angle of about 30 degrees. By this arrangement, with that of the Pedals and the combination movement, the player has remarkable control over the instrument.

The improvements in the mechanism of this noble Organ are patent, and consist: 1st. Of the cylindrical valve. 2nd. The exhausting valve to the pneumatic lever, which would, by engineers, be called an opposition surface valve, its object being to facilitate the exhaustion of the bellows, and thus to enhance the reiteration of the touch. 3rd. The throttle valve to the same, whereby the noise always perceptible in Pneumatic Levers, without this application, is entirely overcome. This is simply a valve placed over the aperture through which the wind must pass to inflate the Pneumatic Lever; and, although the machine retains all the impulsiveness necessary to insure punctuality, its impetus is gradually checked by the Pneumatic Bellows closing this valve, which is admirably contrived to have no connexion with the movement. 4th. The combination movement, and the application of Pneumatic Levers in a compound form, by which we understand one acting upon another. 5th. An improved method of centring or hinging such movements as lead from Draw-stops to Slides, &c. 6th. (not patent). A most valuable contrivance in the coupling of the Pedals with the Manuals, whereby the four Couplers in reality become eight. This is effected by two Pedals on the left of the performer; one Pedal produces the connexion in unison with the Pedal Organ, the other in octaves with the same. They can be used separately or together, and stand in such a position as to enable the performer by one operation to detach the whole coupling movement, though the Stop be drawn. This is a mechanical contrivance so unique, and of such importance and utility, that we cannot help thus expatiating upon it.

Some delay had been experienced in the final arrangements for the erection of this Organ; but the result has justified the propriety of maturely considering the best plans before proceeding with the instrument. To the combined exertions of Dr. Wesley and Mr. Willis the Town Council and the inhabitants are indebted

for an unrivalled instrument; and while the opulence of the Corporation has justified such a large expenditure, the result is both satisfactory and creditable to the gentlemen who have conducted its erection.

226 Liverpool.

The Organ in Great George Street Chapel is a magnificent and well-balanced instrument. It was built by Hill, in 1841, and contains 52 Sounding Stops, of which the following is a list:

Great, 16 Stops.

1—Tenoroon to Tenor c key	16 feet.	8—Flute	4 feet.
2—Bourdon, to meet No. 1	16 feet tone.	9—Tenth	$3\frac{1}{5}$ feet.
3—Open Diapason	8 feet.	10—Twelfth	$2\frac{2}{3}$ feet.
4—Open Diapason	8 feet.	11—Fifteenth	2 feet.
5—Stopped Diapason	8 feet tone.	12—Sesquialtera, III rnks	$1\frac{3}{3}$ foot.
6—Quint	$5\frac{1}{3}$ feet.	13—Mixture, III rnks	$\frac{2}{3}$ foot.
7—Principal	4 feet.	14—Doublette, II rnks	2 feet.
		15—Posaune	8 feet.
		16—Clarion	4 feet.

Swell, 20 Stops.

17—Tenoroon to Tenor c key	16 feet.	26—Fifteenth	2 feet.
18—Bourdon to meet No. 17	16 feet tone.	27—Flageolet	2 feet.
19—Open Diapason	8 feet.	28—Sesquialtera, III rnks	$1\frac{3}{5}$ foot.
20—Dulciana	8 feet.	29—Mixture II rnks	$\frac{2}{5}$ foot.
21—Stopped Diapason	8 feet tone.	30—Echo Cornet V rnks	
22—Quint	$5\frac{1}{3}$ feet.	31—Contra Fagotto	16 feet.
23—Principal	4 feet.	32—Cornopean	8 feet.
24—Suabe Flute	4 feet.	33—Trumpet	8 feet.
25—Twelfth	$2\frac{2}{3}$ feet.	34—Oboe	8 feet.
		35—Corno Flute	8 feet.
		36—Clarion	4 feet.

Choir, 8 Stops.

37—Open Diapason	8 feet.	42—Stopped Flute	4 feet tone.
38—Dulciana	8 feet.	43—Wald Flute	4 feet.
39—Stopped Diapason	8 feet tone.	44—Oboe Flute	4 feet.
40—Clarabella	8 feet.	45—Cremona	8 feet tone.
41—Principal	4 feet.		

Solo Organ, 1 Stop.

46—Tuba Mirabilis....8 feet.

Pedal, 6 Stops.

47—Open Diapason	16 feet.	50—Fifteenth	4 feet.
48—Bourdon	16 feet tone.	51—Sesquialtera, V rnks	$3\frac{1}{5}$ feet.
49—Principal	8 feet.	52—Trombone	16 feet.

Accessory Stops, Movements, &c.

1—Swell to Great.	4—Swell to Pedal.
2—Choir to Great.	5—Choir to Pedal.
3—Great to Pedal.	6 to 10—Five Composition Pedals.

Compass.

Great, CC to f^3 in alt.	Swell, CC to f^3 in alt.
Choir, CC to f^3 in alt.	Pedal, CCC to Tenor d.

227. Liverpool.

The fine Organ in the Collegiate Institution, Liverpool, was built by Mr. Jackson, of Liverpool, in 1850. It contains the 40 Sounding Stops mentioned below.

Great, 13 Stops—16 ranks.

1—Tenoroon	16 feet.	7—Twelfth	2⅔ feet.
2—Bourdon, to meet No. 1	16 feet tone.	8—Fifteenth	2 feet.
3—Great Open Diapason	8 feet.	9—Sesquialtera, III ranks.	
4—Small Open Diapason	8 feet.	10—Mixture	III ranks.
5—Stopped Diapason	8 feet tone.	11—Sharp twentieth.	
6—Principal	4 feet.	12—Trumpet	8 feet.
		13—Clarion	4 feet.

Choir, 11 Stops.

14—Open Diapason	8 feet.	20—Flute	4 feet.
15—Stopped Diapason	8 feet.	21—Piccolo	2 feet.
16—Claribella	8 feet.	22—Fifteenth	2 feet.
17—Keraulophon	8 feet.	23—Bassoon	8 feet.
18—Dulciana	8 feet.	24—Clarionet	8 feet.
19—Principal	4 feet.		

Swell, 9 Stops.

25—Double Diapason	16 feet.	30—Echo Dulciana Cornet, III ranks.	
26—Open Diapason	8 feet.	31—Cornopean	8 feet.
27—Stopped Diapason	8 feet.	32—Oboe	8 feet.
28—Principal	4 feet.	33—Clarion	4 feet.
29—Fifteenth	2 feet.		

Pedal, 7 Stops.

34—Great Open Diapason	16 feet.	38—Fifteenth	4 feet.
35—Bourdon	16 feet.	39—Mixture, VI ranks.	
36—Principal	8 feet.	40—Posaune	16 feet.
37—Twelfth	5⅓ feet.		

Accessory Stops, Movements, &c.

1—Swell to Great.	5—Choir to Pedals.
2—Choir to Swell.	6—Great to Pedals.
3—Sub-octave Choir to Great.	7—Super-octave to Pedals.
4—Swell to Pedals.	8 to 13—Six Composition Pedals.

Compass.

All the Manuals, CC to g^3 in altissimo.	Pedal, CCC to Fiddle g.

228. Manchester.

The Cathedral at Manchester contains two Organs; one at the West End, consisting of Great and Swell Organs, and no Choir; the other over the screen, consisting of a Choir Organ only, and without Pedals.

The West End Organ was made about seventy years ago, and paid for by the parish. The name of the builder is not known. At the first Musical Festival, in 1828, it was removed from the centre of the building, where it was originally erected, to the west end of the Church, where it still remains, and is used for the Sunday services, which are only parochial. The following is a list of the Stops in the West End Organ:

Great, 15 Stops—Compass from GG to F in alt.

1—Double Stopped Diapason to GGG.
2—Open Diapason.
3—Ditto Ditto.
4—Dulciana.
5—Claribella.
6—Stopped Diapason.
7—Principal.
8—Ditto.
9—Flute.
10—Twelfth.
11—Fifteenth.
12—Sesquialtera, IV ranks throughout.
13—Trumpet.
14—Clarion, bass.
15—Cremona.

Swell, 7 Stops—Compass from C to F in alt.

16—Double Diapason.
17—Open Diapason.
18—Stopped Diapason.
19—Principal.
20—Fifteenth.
21—Hautboy.
22—Trumpet.

Pedal, 1 Stop.

23—One Octave of Pedal Pipes, very small scale, from CCC to BB.

Two Octaves and a half of Pedal keys.

Pedal Coupler, Swell Coupler, old shifting movement, and the old "lifting door" to the swell box. Tho entire scale is small, therefore very shrill, and the bass remarkably thin.

The *Choir Organ* is a little gem. It was built by Father Smith, and remains in its original state. It contains 8 Stops, of which the following is a list:

1—Open Diapason, to Middle c^1.
2—Hohl-flote, to Middle c^1.
3—Stopped Diapason throughout.
4—Principal throughout.
5—Flute throughout.
6—Fifteenth throughout.
7—Vox Humana, Treble.
8—Bassoon, Bass.

Compass.

GG with GG♯ to d^3 in alt.

229. Manchester.

The fine Organ in St. Luke's, Manchester, was built by Hill, in 1840.

Great, 10 Stops—CC to F in alt.

1—Double Open Diapason 16 feet.
2—Open Diapason ..... 8 feet.
3—Stopped Diapason ... 8 feet.
4—Principal ..... 4 feet.
5—Fifteenth ..... 2 feet.
6—Twelfth ..... 3 feet.
7—Sesquialtera, III ranks.
8—Mixture.... II ranks.
9—Octave Fifteenth.... 1 foot.
10—Posaune ..... 8 feet.

Choir, 10 Stops—CC to F in alt.

11—Open Diapason ..... 8 feet.
12—Stopped Diapason ... 8 feet.
13—Claribella ..... 8 feet.
14—Principal ..... 4 feet.
15—Dulciana ..... 8 feet.
16—Fifteenth ..... 2 feet.
17—Oboe Flute ..... 4 feet.
18—Wald Flute ..... 4 feet.
19—Piccolo ..... 2 feet.
20—Cremona ..... 8 feet.

Swell, 7 Stops—Tenor C to F.

21—Double Open Diapason 16 feet.
22—Open Diapason .... 8 feet.
23—Stopped Diapason .. 8 feet.
24—Principal ..... 4 feet.
25—Doublette, II ranks.. 2 feet.
26—Cornopean ..... 8 feet.
27—Oboe ..... 8 feet.

Pedal, 3 Stops—One Octave, CCC to CC.

28—Open Diapason .... 16 feet.
29—Bourdon ..... 16 feet.
30—Trombone ..... 16 feet.

Couplers.

1—Choir to Great.
2—Swell to Great.
3—Great to Pedals.
4—Choir to Pedals.
5—Swell to Pedals.
6, 7—Two Composition Pedals to Swell.
8, 9, 10—Three Composition Pedals to Great.

230. Manchester.

The Organ in Holy Trinity Church, Manchester, was built in 1852, by Kirtland and Jardine, of Manchester. It has 4 Manuals, Great Organ, Choir, Swell, and Solo, besides an independent Pedal, and contains 49 Stops, of which the following is a list:

Great, 14 Stops—CC to F, 54 notes.

1—Bourdon ..... 16 feet.
2—Open Diapason ..... 8 feet.
3—Salcional ..... 8 feet.
4—Stop Diapason, bass.. } 8 feet.
5—Clarabella ..... }
6—Quint ..... 5⅓ feet.
7—Principal ..... 4 feet.
8—Clear Flute ..... 4 feet.
9—Twelfth ..... 2⅔ feet.
10—Fifteenth ..... 2 feet.
11—Sesquialtera, III ranks. 1⅗ foot.
12—Mixture....III ranks. 1 foot.
13—Trumpet ..... 8 feet.
14—Clarion ..... 4 feet.

Choir, 11 Stops—CC to F, 54 notes.

*15—Bourdon ..... 16 feet.
16—Dulciana ..... 8 feet.
17—Stop Diapason, bass . } 8 feet.
18—Stop Diapason, treble }
19—Viola di Gamba, Tenor c 8 feet.
20—Principal ..... 4 feet.
21—Rohrflute, Tenor c... 4 feet.
22—Twelfth ..... 2⅔ feet.
23—Fifteenth ..... 2 feet.
24—Flageolet, Tenor c... 2 feet.
25—Bassoon and Clarinet . 8 feet.

Swell, 10 Stops—CC to F, 54 notes.

26—Bourdon ..... 16 feet.
27—Open Diapason..... 8 feet.
28—Stop Diapason ..... 8 feet.
29—Principal ..... 4 feet.
30—Twelfth ..... 2⅔ feet.
31—Fifteenth ..... 2 feet.
32—Mixture, III ranks .. 1⅗ foot.
33—Cornopean ..... 8 feet.
34—Hautboy ..... 8 feet.
35—Clarion ..... 4 feet.

Solo, 5 Stops—Tenor C to F, 42 notes.

*36—Gamba ..... 8 feet.
*37—Vox Angelica ..... 8 feet.
*38—Flauto Traverso .... 4 feet.
*39—Flute harmonique... 4 feet.
*40—Æoline ..... 8 feet.

Pedal, 9 Stops—CCC to F, 30 Notes.

41—Open Diapason ..... 16 feet.
42—Stopped Diapason.... 16 feet.
43—Quint .....10⅔ feet.
44—Principal ..... 8 feet.
45—Twelfth ..... 5⅓ feet.
46—Fifteenth... ..... 4 feet.
47—Mixture (19—22—26—29).
*48—Posaune ..... 16 feet.
*49—Clarion ..... 8 feet.

Couplers..... 6 | Ventils ..... 4 | Composition Pedals.. 6

The keys are 25 feet from the Organ, yet the "touch" is *remarkably* crisp, and pleasant to the performer. The keys of the Solo, Swell, and Great Organs each project an inch over the keys next below them; by this means the top set (Solo) is brought 3 inches nearer to the performer than in keys made in the usual manner. The Stops marked (*) have no Pipes in, but are "prepared" to receive them.

233. Manchester.

The new Organ now being built for St. Peter's Church, Manchester, by Kirtland and Jardine, is to contain 47 Stops, of which the following is a list:

Great, 12 Stops—CC to g^3 in altissimo.

	Feet.	Pipes.		Feet.	Pipes.
1—Double Open Diapason	16	56	7—Clear Flute	4	56
2—Open Diapason	8	56	8—Twelfth	$2\frac{2}{3}$	56
3—Gamba	8	56	9—Fifteenth	2	56
4—Stopped Dapason	8	56	10—Full Mixture, V rnks.	2	56
5—Flute Harmonique	8	35	11—Sharp Ditto, V rnks.	1	56
6—Principal	4	56	12—Trumpet	8	56

Swell, 12 Stops—CC to g^3 in altissimo.

	Feet.	Pipes.		Feet.	Pipes
13—Bourdon	16	56	19—Twelfth	$2\frac{2}{3}$	56
14—Open Diapason	8	56	20—Fifteenth	2	56
15—Stopped Diapason	8	56	21—Mixture, V ranks.	2	56
16—Hohl Flute	8	56	22—Cornopean	8	56
17—Principal	4	56	23—Hautboy	8	56
18—Gedact Flute	4	56	24—Clarion	4	56

Choir, 12 Stops—CC to g^3 in altissimo.

	Feet.	Pipes.		Pipes.	Feet.
25—Bourdon	16	56	31—Flauto traverso	4	56
26—Spitzflote	8	56	32—Rohrflote	4	44
27—Dulciana	8	56	33—Fifteenth	2	56
28—Gedact	8	56	34—Mixture, IV ranks.	$1\frac{1}{3}$	56
29—Keraulophone	8	56	35—Bassoon	16	44
30—Gemshorn	4	56	36—Æoline	8	56

Pedal, 11 Stops—CCC to Tenor f.

37—Sub-Bass	wood	32 feet tone.	42—Principal	metal	8 feet.
38—Open Diapason, metal		16 feet.	43—Violoncello	wood	8 feet.
39—Open Diapason, wood		16 feet.	44—Twelfth	metal	$5\frac{1}{3}$ feet.
40—Stopped Diapason, wood		16 feet tone.	45—Fifteenth	metal	4 feet.
41—Quint-Gedact	wood	$10\frac{2}{3}$ ft. tone.	46—Posaune	metal	16 feet.
			47—Trumpet	metal	8 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great, unison.
2—Coupler, Swell to Great, octave.
3—Coupler, Swell to Great, sub-octave.
4—Coupler, Swell to Pedal.
5—Coupler, Great to Pedal.
6—Coupler, Choir to Pedal.
7—Sforzando Pedal, Great to Swell.
8—Great Organ to Pedals.
9—Tremulant.
10 to 15—Six Composition Pedals; viz.
2 to Great Organ.
2 to Choir Organ.
2 to Swell Organ.

Summary.

Draw Stops, Great Organ	12	Copulæ	6
Draw Stops, Choir Organ	12	Clochette	1
Draw Stops, Swell Organ	12		—
Draw Stops, Pedal Organ	11	Total number of Draw Stops	60
Composition Pedals	6	Other Copulæ	3

232. Ashton-under-Line.

The magnificent Organ, in the Parish Church at Ashton-under-line was the noble gift of Edward Brown, Esq. of the Firs, and was built by Hill, in the year 1845. It contains 55 sounding Stops, besides 8 Couplers, 3 Manuals, and a Pedal of 6 Stops. The following is its disposition:

Great, 21 Stops.

	Pipes.	Feet.
1—Tenoroon Diapason	42	16
2—Bourdon, CCC to BB	12	16 tone.
3—Open Diapason	54	8
4—Open Diapason	54	8
5—Stopped Diapason to Tenor c	42	8 tone.
6—Stopped Diapason, Bass	12	8 tone.
7—Quint	54	$5\frac{1}{3}$
8—Principal	54	4
9—Wald Flute, to Tenor c	42	4
10—Tenth	54	
11—Twelfth	54	$2\frac{2}{3}$
12—Fifteenth	54	2
13—Tierce	54	$1\frac{3}{5}$
14—Sesquialtera, III rnks.	162	$1\frac{3}{5}$
15—Mixture, III rnks.	162	$\frac{4}{5}$
16—Doublette, II rnks.	108	2
17—Tenoroon Trumpet	42	16
18—Double Trumpet, CCC to BB	12	16
19—Posaun	54	8
20—Clarion	54	4
21—Octave Clarion	54	2

Swell, 18 Stops.

	Pipes.	Feet.
22—Tenoroon Dulciana	42	16
23—Bourdon, CCC to BB	12	16 tone.
24—Open Diapason	54	8
25—Echo Dulciana, to Tenor c	42	8
26—Stopped Diapason, Treble	42	8 tone.
27—Stopped Diapason, Bass	12	8 tone.
28—Principal	54	4
29—Suabe Flute, to Tenor c	42	4
30—Twelfth	54	$2\frac{2}{3}$
31—Fifteenth	54	2
32—Flageolet, Tenor c.	42	2
33—Sesquialtera, III ranks.	162	$1\frac{3}{5}$
34—Mixture, II ranks.	108	$\frac{2}{3}$
35—Echo Dulciana Cornet, to Tenor c, V ranks.	210	
36—Tenoroon Trumpet to Tenor c	42	16
37—Cornopean	54	8
38—Oboe	54	8
39—Clarion	54	4

Choir, 10 Stops.

	Pipes.	Feet.
40—Open Diapason	54	8
41—Claribel, to Tenor c.	42	8
42—Viol de Gamba, to Tenor c	42	8
43—Stopped Diapason, Bass	12	8 tone.
44—Principal	54	4
45—Oboe Flute, to Tenor c	42	4
46—Stopped Flute, to Tenor c	42	4 tone.
47—Fifteenth	54	2
48—Piccolo, to Tenor c.	42	2
49—Cremona, to Tenor c	42	8 tone

Pedal, 6 Stops.

	Pipes.	Feet.
50—Open Diapason	27	16
51—Bourdon	27	16 tone.
52—Principal	24	3
53—Fifteenth	27	4
54—Mixture, V ranks	135	$3\frac{1}{5}$
55—Trombone	27	16

Accessory Stops, Movements, &c.

1 to 8—Eight Couplers.
9 to 14—Six Composition Pedals.
15—Sforzando Pedal.

Compass.

Great Organ, CC to f³ in alt.	54 notes.	Choir Organ, CC to f³ in alt.	54 notes.
Swell Organ, CC to f³ in alt.	54 notes.	Pedal Organ, CCC to Tenor d,	27 notes.

Summary of Pipes and Stops.

	Pipes.	Stops.
Great Organ	1230	21
Swell Organ	1134	18
Choir Organ	426	10
Pedal Organ	270	6
Total	3060	55

233. Stockport.

The Organ in the large room of the Stockport Sunday School was built in 1853, by Kirtland and Jardine of Manchester, according to a scheme drawn up by George Cooper, Esq. of London, and which does great credit to the judgment of that gentleman. The instrument contains 23 Sounding Stops, distributed among 2 complete Manuals and Pedal in the following manner:

Great, 12 Stops.

	Feet.	Pipes.		Feet.	Pipes.
1—Open Diapason, (major)	8	54	8—Fifteenth	2	54
2—Open Diapason, (minor)	8	59	9—Sesquialtera, IV rnks	1⅓	216
3—Stopped Diapason	8 tone.	54	10—Trumpet	8	54
4—Dulciana	8	54	11—Clarion	4	54
5—Wald Flute	4	54	12—Cremona, to Fiddle G	8	35
6—Principal	4	54	Number of Pipes		636
7—Twelfth	2⅔	54			

Swell, 10 Stops.

	Feet.	Pipes.		Feet.	Pipes.
13—Double Stopped Diapason	16	54	18—Hohl Flute	4	54
14—Open Diapason	8	54	19—Fifteenth	2	54
15—Stopped Diapason	8	54	20—Sesquialtera, III rnks.	1⅗	162
16—Keraulophon, to Tenor c	8	42	21—Cornopean	8	54
17—Principal	4	54	22—Hautboy	8	54
			Pipes in Swell		636

Pedal, 1 Stop.

23—Open Diapason, 16 feet.

Accessory Stops, Movements, &c.

1—Swell to Great, Unison.
2—Swell to Great, Sub-Octave.
3—Swell to Great, Octave.
4—Great to Pedal.
5—Swell to Pedal.
6 to 9—Four Composition Pedals to Great Organ.
10 and 11—Two Composition Pedals to Swell Organ.
12—Pedal, Sub-Octave-Swell.
13—Pedal, Unison Octave Swell.
14—Pedal, Octave Swell.
15—Sforzando Pedal, acting simultaneously upon the three Swell Couplers.

Compass.

Great, CC to f³ in alt.	Pedal, CCC to Tenor f.
Swell, CC to f³ in alt.	

The arrangement of the Pedal Swell Couplers enables the performer to make the various combinations of Great Organ with the Swell either by hand with the Draw-Stops, or by the foot. By their instrumentality, on the one hand, the power of the Instrument may be more than doubled, and, on the other, such a variety of ochestral effects may be produced as could in no other way be placed within reach of a single performer.

The Swell Organ is the largest in the district (excepting the one at the Holy Trinity Church, Manchester); the dimensions of the Swell Box being 10 feet 6 inches high, by 10 feet wide, and nearly 5 feet from front to back.

Another novel feature of the instrument is the introduction of the "equal temperament," as adopted in all the great Continental Organs. The advantages of this mode of tuning are very important, enabling the performer to play in any key, even the most extreme, without offending the ear of the musician, as is the case in the present mode, when playing in the keys of A flat, D flat, and many others.

The "Chorus" of the Great Organ, although consisting of IV ranks only, returns to an *Open Diapason*, Principal, Twelfth, and Fifteenth, at Treble c^2. By this arrangement, the portion of a Manual that is usually the weakest—the upper octave and a half—is reinforced by Pipes of greater gravity and sonority than usually appear in the Mixture-work; brilliancy meanwhile being secured by the acute pitch of the notes themselves. This is the first Organ in England in which this Composition (adopted at the suggestion of the writer) was tried with so few ranks of Compound-work; and it has since been followed by Robson, in his Belfast and other Organs; and by Walker, in his Prestbury Organ.

234. Oldham.

The Organ in the Parish Church at Oldham was built in the year 1830, by Elliott and Hill, of London, and is a very fine instrument. It contains 31 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Double Diapason, Treble.
2—Double Diapason, Bass.
3—Open Diapason, No. 1.
4—Open Diapason, No. 2.
5—Stopped Diapason.
6—Principal, No. 1.
7—Principal, No. 2.
8—Twelfth.
9—Fifteenth.
10—Sesquialtera, IV ranks.
11—Mixture, .. III ranks.
12—Trumpet, Treble.
13—Trumpet, Bass.
14—Clarion.

Choir, 8 Stops.

15—Open Diapason.
16—Stopped Diapason.
17—Principal.
18—Flute.
19—Fifteenth.
20—Flageolet.
21—Cremona.
22—Bassoon.

Swell, 8 Stops.

23—Double Diapason.
24—Open Diapason.
25—Stopped Diapason.
26—Dulciana.
27—Principal.
28—Mixture, III ranks.
29—Trumpet.
30—Hautboy.

Pedal, 1 Stop.

31—Pedal Pipes.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Choir to Pedal.
4, 5, 6—Three Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell Organ, Tenor c to f^3 in alt.
Swell Clavier, down to GG, and acting on Choir Organ below Tenor c.
Pedal Clavier, GG to Tenor d.

235. Huddersfield.

The Organ in Buxton Road Chapel, Huddersfield, was built by T. J. Robson, of London, and consists of three Manuals, Great, Choir, and Swell, with an independent Pedal Organ of 9 Stops. In its construction it has been a special object to embody as many of the finest features of the German and English Instruments as could conveniently be introduced. The Manual Organs are of the full compass, and the Pedal Organ (a department which is too often limited, and consequently defective either in range, number of Stops, or both) is of ample and corresponding proportions. The Organ contains 40 Sounding Stops, of which the following is a list:

Great, 15 Stops.

Compass, CC to C altissimo. (61 notes.)

1—Double Open Diapason, metal throughout ..... 16 feet.
2—Large Open Diapason. 8 feet.
3—Open Diapason .... 8 feet.
4—Stopped Diapason. .. 8 feet tone.
5—Quint ..... 6 feet.
6—Principal ..... 4 feet.
7—Wald Flute ..... 4 feet.
8—Twelfth ..... 3 feet.
9—Fifteenth ..... 2 feet.
10—Piccolo ..... 2 feet.
11—Sesquialtera, III rnks. $1\frac{3}{5}$ foot.
12—Mixture, ...II rnks. $\frac{2}{3}$ foot.
13—Furniture, ..III rnks.
14—Trumpet ..... 8 feet.
15—Clarion ..... 4 feet.

Choir, 4 Stops.

Compass, CC to C altissimo. (61 notes.)

16—Stopped Diapason and Claribella ..... 8 feet tone.
17—Dulciana ..... 8 feet.
18—Viol di Gamba .... 8 feet.
19—Principal ..... 4 feet.

Swell, 12 Stops.

Compass, CC to C altissimo. (61 notes.)

20—Double Diapason ... 16 feet tone.
21—Open Diapason .... 8 feet.
22—Stopped Diapason... 8 feet tone.
23—Viol di Gamba .... 8 feet.
24—Principal ..... 4 feet.
25—Fifteenth ..... 2 feet.
26—Sesquialtera, III ranks $1\frac{3}{5}$ foot.
27—Contra Fagotto, metal ..... 16 feet.
28—Clarionet, and Corni di Bassetto ..... 8 feet.
29—Hautboy ..... 8 feet.
30—Horn ..... 8 feet.
31—Clarion ..... 4 feet.

Pedal, 9 Stops.

The Compass of the Pipes, CCC to F (42 notes), three and a half octaves, the upper octave being added for the purpose of completing the Octave Copula, whereby the effect of 18 Stops is gained throughout the Pedal range.

32—Open Diapason .... 16 feet.
33—Violone ..... 16 feet tone.
34—Principal ..... 8 feet.
35—Quint ..... 6 feet.
36—Fifteenth ..... 4 feet.
37—Sesquialtera, V ranks $3\frac{1}{5}$ feet.
38—Posaune, metal .... 16 feet.
39—Trumpet ..... 8 feet.
40—Clarion ..... 4 feet.

Couplers, &c.

1—Swell to Great.	3—Choir to Pedals.
2—Great to Pedals.	4—Octave Pedals.

5 to 10, Six Composition Pedals.

Summary of Stops and Pipes.

	Stops.	Pipes.
Great Organ	15	1232
Swell Organ	12	854
Choir Organ	4	220
Pedal Organ	9	546
Copulas	4	—
	—	2852
	44	

236. Huddersfield.

The Organ in Highfield Chapel, Huddersfield, was built by Walker in 1854. It is enclosed in an elegant Case, made from a design by Messrs. Perkin and Backhouse, of Leeds, and measures 23 feet in height, and 22 feet in width. The instrument contains 34 Sounding Stops, of which the following is a list:

Great, 14 Stops.

	Feet.	Pipes.		Feet.	Pipes.
1—Double Open Diapason, metal through	16	56	7—Flute, wood	4	56
2—Open Diapason, metal, large	8	56	8—Twelfth	3	56
3—Open Diapason, metal, small	8	56	9—Piccolo, metal	2	56
4—Stopped Diapason, wood bass, metal treble	8 tone.	56	10—Fifteenth, metal	2	56
5—Quint-gedact, wood	6 tone.	56	11—Sesquialtera, III rnks	$1\frac{3}{5}$	168
6—Principal, metal	4	56	12—Mixture ....II rnks	$\frac{2}{3}$	112
			13—Trumpet	8	56
			14—Clarion	4	56
			Pipes in Great Organ		952

Swell, 11 Stops—every Stop throughout.

	Feet.	Pipes.		Feet.	Pipes.
15—Double Diapason, wood, Stopped	16	56	21—Fifteenth	2	56
16—Open Diapason, metal	8	56	22—Sesquialtera, III rnks	$1\frac{3}{5}$	168
17—Keraulophon, metal	8	56	23—Horn	8	56
18—Stopped Diapason, wood	8	56	24—Oboe	8	56
19—Principal, metal	4	56	25—Clarion	4	56
20—Flute, metal Treble	4	56	Pipes in Swell		718

Choir, 6 Stops.

	Feet.	Pipes.		Feet.	Pipes.
26—Dulciana, metal	8	56	30—Flute, metal	4	56
27—Viol di Gamba, metal, Tenor c	8	44	31—Cremona, Tenor c	8	54
28—Stopped Diapason, Bass	8	56	Pipes in Choir Organ		256
29—Stopped Diapason, Treble					

Pedal, 3 Stops.

	Feet.	Pipes.		Feet.	Pipes.
32—Open Diapason, wood	16	29	34—Octave, metal	8	29
33—Bourdon, wood, Stopped	16	29	35—Spare for Trombone.		—
			Pipes in Pedal Organ		87

Couplers, &c.

1—Swell to Great.	6—Choir to Swell.
2—Swell to Great, Sub Octave.	7—Swell to Choir.
3—Swell to Great, Super Octave.	8—Great to Pedal.
4—Swell to Pedal.	9—Pedals, Super Octave.
5—Choir to Pedal.	10 to 13—Four Composition Pedals.

Summary.

	Stops.	Pipes.			
Great Organ	14	952	Couplers	9	
Swell	11	718		—	
Choir	6	256		44	2013
Pedal Organ	4	87			

Compass.

All the Manuals, CC to g^3 in altissimo. | Pedal, CCC to Tenor e.

237. Halifax.

The Parish Church at Halifax contains one of Snetzler's finest as well as most unique Organs. In the year 1764, a subscription was set on foot in Halifax, for purchasing the present valuable Organ for the Parish Church, for keeping the Organ in repair, and for providing a salary for the Organist. The amount raised was upwards of £1200. Considerable opposition appears to have been manifested by the township of Sowerby to the erection of the instrument, on the plea that it would entail additional expense upon the township; and their Churchwardens appeared by Proctor to oppose the faculty. A suit was instituted; but such was the strong feeling of the parishioners generally in favour of the Organ, that a subscription was entered into, amounting to upwards of £720, to defray the expenses of the suit. The call upon the subscribers, however, only amounted to twenty-five per cent. The sum actually received was £194 : 5s. when the law suit was happily terminated; and, on the 11th of July, 1766, the faculty for playing the Organ was granted by the Archbishop of York, and the Organ was accordingly opened on the 28th and 29th of August following. This event was announced in the Leeds Intelligencer of August 19th, 1766, by an advertisement, of which the following is a copy: "At the opening of the new Organ, in the parish church of Halifax, Yorkshire, on Thursday and Friday, the 28th and 29th of this instant, August, will be performed, with the assistance of a very numerous band of the most eminent performers, both vocal and instrumental, from various parts of England,

The Messiah,

An Oratorio, composed by Mr. Handel.

Between the first and second Acts, a Concerto on the Organ.

"Tickets, 5s. and 2s. 6d. each. Doors to be opened at Nine o'Clock in the Morning each day, and the performance to begin at half an hour after Ten. There will be an Assembly each Evening at the Talbot.

"N. B. An Organist is wanted. Any person who is inclined to offer himself a Candidate may apply for farther particulars to the Rev. Mr. Bates, at Halifax."

On Saturday, the 30th of August, 1766, Mr. Herschell (afterwards Dr. Herschell, the celebrated astronomer) was unanimously elected Organist, but only held the appointment till the following November, when he removed to Bath, where he burst forth from obscurity, and rose to the highest pitch of celebrity in the dignified science of Astronomy.

The Organ has received several additions since then, the first of which was an octave and a half of Pedals—GG to Tenor c—by Greenwood, of Leeds. In 1836, Gray added an octave and a half of Double Open Diapason Pipes; put in a Dulciana to Gamut G, in lieu of the Vox Humana; also a new Bellows, and several Composition Pedals. In 1842, Hill extended the Swell down an octave, namely, from Fiddle g to Gamut G; added a Double Diapason and Cornopean to the Swell; and applied a Coupler to unite the Choir Organ to the Great in the octave below, which proved unusually effective, as the Open as well as the Stopped Diapason in the Choir Organ descends uninterruptedly down to GG. After these improvements, the Organ was re-opened on the 30th of January, 1843, by the present Organist, Mr. Frobisher, with a performance of Organ Music.

The Organ now contains 26 Sounding Stops, of which the following is a list:

Great, 11 Stops.

1—Open Diapason, through 8 feet.	7—Sesquialtera, IV ranks 2 feet.
2—Open Diapason, through 8 feet.	8—Mixture .. III ranks 1 foot.
3—Stopped Diapason .. 8 feet tone.	9—Mounted Cornet, to Middle c^1, V ranks 8 feet tone.
4—Principal ..... 4 feet.	10—Trumpet ..... 8 feet.
5—Twelfth .. .. $2\frac{2}{3}$ feet.	11—Clarion ..... 4 feet.
6—Fifteenth ..... 2 feet.	

Swell, 7 Stops.

12—Double Diapason .... 16 feet tone.	16—Sesquialtera, III ranks $2\frac{2}{3}$ feet.
13—Open Diapason .... 8 feet.	17—Cornopean ..... 8 feet.
14—Stopped Diapason .. 8 feet tone.	18—Oboe ..... 8 feet.
15—Principal ..... 4 feet.	

Choir, 7 Stops.

19—Open Diapason, through 8 feet.	23—Flute ..... 4 feet tone.
20—Stopped Diapason .. 8 feet tone.	24—Fifteenth ..... 2 feet.
21—Dulciana to Gamut G 8 feet.	25 { Bassoon, Treble .... } 8 feet. { Bassoon, Bass ..... }
22—Principal ..... 4 feet.	

Pedal, 1 Stop.

26—Great Open Diapason, wood, DD down to GGG.. $21\frac{1}{3}$ feet length.

238. Halifax.

The Organ in Harrison Road Chapel, Halifax, was built by Messrs. Holt (then of Halifax, now of Bradford), in 1838. It has 3 sets of keys; namely, Great Organ and Choir from GG, including GG♯, to F in alt, and Swell from Tenor C to F in alt, $3\frac{1}{2}$ octaves, with 2 octaves of Pedals, CCC to Tenor C, and Pedal Pipes from GGG to CC.

Great, 10 Stops.

1—Open Diapason.	6—Fifteenth.
2—Open Diapason.	7—Sesquialtera.
3—Stopped Diapason.	8—Cornet.
4—Principal.	9—Trumpet, Treble.
5—Twelfth.	10—Trumpet, Bass.

Choir, 6 Stops.

11—Stopped Diapason.	14—Flute.
12—Dulciana.	15—Fifteenth.
13—Principal.	16—Cremona.

Swell, 6 Stops.

17—Double Stopped Diapason.
18—Stopped Diapason.
19—Dulciana.
20—Principal.
21—Hautboy.
22—Trumpet.

Pedal, 1 Stop.

23—Double Open Diapason down to GGG.. 21⅓ feet length.

Pedal Clavier down to CCC.

Couplers.

1—Pedals to Great Organ.
2—Pedals to Choir.
3—Swell to Great Organ.
4—Swell to Choir.

239. Bradford.

The Organ in Eastbrook Chapel, Bradford, was built by Hill, in 1844-5. It has 3 Manual Organs of complete compass; a Pedal of 7 Stops; and 44 Stops, of which the following is a list:

Great, 15 Stops.

1—Tenoroon..... 16 feet.
2—Bourdon.....metal 16 feet.
3—Open Diapason.... 8 feet.
4—Open Diapason.... 8 feet.
5—Stopped Diapason.. 8 feet tone.
6—Quint..... 5⅓ feet.
7—Principal..... 4 feet.
8—Wald Flute..... 4 feet.
9—Tenth..... 3⅕ feet.
10—Twelfth..... 2⅔ feet.
11—Fifteenth..... 2 feet.
12—Sesquialtera, V ranks 1⅗ foot.
13—Mixture.. III ranks ⅘ foot.
14—Posaune..... 8 feet.
15—Clarion..... 4 feet.

Swell, 14 Stops.

16—Tenoroon..... 16 feet.
17—Bourdon..... 16 feet.
18—Open Diapason.... 8 feet.
19—Stopped Diapason... 8 feet tone.
20—Dulciana, to Tenor c. 8 feet.
21—Principal..... 4 feet.
22—Flute..... 4 feet.
23—Twelfth..... 2⅔ feet.
24—Fifteenth..... 2 feet.
25—Flageolet..... 2 feet.
26—Sesquialtera, III rks. 1⅗ foot.
27—Cornopean..... 8 feet.
28—Hautboy..... 8 feet.
29—Clarion..... 4 feet.

Choir, 8 Stops.

30—Open Diapason.... 8 feet.
31—Stopped Diapason.. 8 feet tone.
32—Viol de Gamba.... 8 feet.
33—Principal..... 4 feet.
34—Wald Flute..... 4 feet.
35—Fifteenth..... 2 feet.
36—Cremona..... 8 feet tone.
37—Bassoon..... 8 feet.

Pedal, 7 Stops.

38—Open, wood, to GGG 32 feet.
39—Open, metal..... 16 feet.
40—Principal..... 8 feet.
41—Twelfth..... 6 feet.
42—Fifteenth..... 4 feet.
43—Sesquialtera, V ranks 3⅕ feet.
44—Trombone..... 16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Swell to Pedal.
4—Coupler, Choir to Pedal.
5, 6, 7—Three Composition Pedals.

Compass.

Great, CC to f^3 in alt, 54 Notes.
Swell, the same.
Choir, the same.
Pedal, CCC to Tenor d, 27 Notes.

240. Leeds.

The Organ in St. Peter's Chapel, Leeds, was built by the late Mr. Joseph Booth, of Wakefield, and contains 30 Sounding Stops.

Great, 11 Stops—CCC to F, 66 Notes.

1—Double Open Diapason, metal, meets the Pedals.
2—Open Diapason, metal.
3—Open Diapason, metal.
4—Stopped Diapason.
5—Principal.
6—Principal.
7—Twelfth.
8—Fifteenth.
9—Sesquialtera.
10—Trumpet.
11—Trombone.

Choir, 6 Stops—GG to F.

12—Open Diapason, metal.
13—Stopped Diapason.
14—Dulciana.
15—Principal.
16—Flute.
17—Bassoon and Cremona.

Swell, 11 Stops—CC to F.

18—Double Open Diapason, metal.
19—Open Diapason, metal.
20—Stopped Diapason.
21—Dulciana.
22—Principal.
23—Principal.
24—Twelfth.
25—Fifteenth.
26—Cremona.
27—Hautboy.
28—Trumpet.

Pedal, 3 Stops—2 Octaves.

29—Double Open Diapason down to GGG .... 21⅓ feet.
30—Open Diapason.
31—Principal.

Couplers, &c.

1—Great Organ to Pedals.
2—Swell to Great.
3—Choir to Great.
4 to 7—Four Composition Pedals.

241. Leeds.

The Organ in Brunswick Chapel, Leeds, was also built by the late Mr. Joseph Booth, of Wakefield.

Great, 11 Stops—GG to F in alt.

1—Double Open Diapason, metal ..... 21⅓ feet.
2—Open Diapason, metal . 10⅔ feet.
3—Open Diapason, metal . 10⅔ feet.
4—Stopped Diapason.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, IV ranks.
9—Cornet.....V ranks.
10—Trumpet.
11—Clarion.

Choir, 8 Stops—GG to F in alt.

12—Double Dulciana, metal.. 16 feet.
13—Open Diapason, metal..10⅔ feet.
14—Viol di Gamba.
15—Stopped Diapason.
16—Principal.
17—Flute.
18—Bassoon.
19—Cremona.

Swell, 12 Stops—CC to F in alt.

20—Double Open Diapason, metal ..... 16 feet.
21—Open Diapason, metal 8 feet.
22—Stopped Diapason.
23—Dulciana .... metal 8 feet.
24—Claribella ..... 8 feet.
25—Viol di Gamba..... 8 feet.
26—Principal..... 4 feet.
27—Cornopean ..... 8 feet.
28—Hautboy..... 8 feet.
29—Trumpet ..... 8 feet.
30—Cremona ..... 8 feet tone.
31—Clarion ..... 4 feet.

Pedal, 4 Stops—CCC, 2 Octaves.

32—Double Open Diapason, wood 32 feet.
33—Open Diapason . . wood 16 feet.
34—Principal . . . . . 8 feet.
35—Trombone . . . . . metal 16 feet.

Couplers.

1—Swell to Great.
2—Choir to Great.
3—Choir to Pedal.
4—Great to Pedal.

242. PRESTON.

The Organ in Preston Parish Church was originally built by Davis, of London, in 1802, and had a Great Organ from GG to F in alt, and a Swell to Fiddle G. No Pedals or Pedal Pipes—Diagonal Bellows.

In 1822. A set of Unison Pedal Pipes (an octave and half) and new Bellows were put in.

In 1842. A new Choir Organ was added by Gray and Davison, of London, at the cost of S. Horrocks, Esq. Guild Mayor; but, unfortunately, the Great Organ, and Swell, and Pedals received no addition.

In 1850. The Organ was entirely rebuilt; a new Pedal Organ added; the Swell extended to Tenor C; and several new Stops added to it and to the Great Organ. These additions were made by Jackson, of Liverpool, from funds raised by public subscription.

In 1854. W. A. Cross, Esq. of Red Scar, gave funds for a Metal Double Diapason and a new Great Organ Sound-board; Mr. Greaves, the Organist, adding the ♯ Twentieth at his own expense. Two spare Slides were prepared on the Great Organ Sound-board for a wood Principal and a wood Fifteenth. The Organ has now 36 Sounding Stops, of which the following is a list:

Great, 16 Stops.

1—Double Diapason, bass } in metal.
2—Double Diapason, treble }
3—Stopped Diapason.
4—Open Diapason, large scale.
5—Open Diapason.
6—Principal, metal.
7—Principal, wood.
8—Twelfth.
9—Fifteenth, metal.
10—Fifteenth, wood.
11—Sesquialtera, III ranks.
12—Mixture . . . . II ranks.
13—Twentieth.
14—Trumpet, bass.
15—Trumpet, treble.
16—Clarion.

Choir, 7 Stops.

17—Stopped Diapason.
18—Clarabella.
19—Dulciana.
20—Principal.
21—Flute.
22—Fifteenth.
23—Cromorne.

Swell, 9 Stops.

24—Double Diapason.
25—Stopped Diapason.
26—Open Diapason.
27—Keraulophon.
28—Principal.
29—Fifteenth.
30—Mixture.
31—Hautboy.
32—Cornopean.

Pedal, 4 Stops.

33—Open Diapason . . . . 16 feet.
34—Principal . . . . . 8 feet.
35—Fifteenth . . . . . 4 feet.
36—Sesquialtera, III ranks.

Accessory Stops, Movements, &c.

1—Coupler, Pedals to Great.
2—Coupler, Pedals to Choir.
3—Coupler, Swell to Great.
4—Coupler, Choir to Swell.
5—Coupler, Octave Coupler Swell.
6, 7—Three Composition Pedals for Great Organ Stops.

Compass.

Great and Choir Organs, from CC to f^3 in alt.
Swell, from Tenor C to f^3 in alt.
Pedal, CCC to Tenor e.

243. Preston.

The Organ in St. Walburgh's Catholic Church, Preston, was built by Messrs. Hill and Co. in 1855. It contains 30 Sounding Stops, distributed among 2 Manuals and Pedal, in the following manner:

Great, 15 Stops.
Every Stop throughout.

1—Double open Diapason	16 feet.	9—Fifteenth	2 feet.
2—Open Diapason	8 feet.	10—Piccolo	2 feet.
3—Gamba	8 feet.	11—Sesquialtera, III ranks	$1\frac{3}{5}$ foot.
4—Stopped Diapason	8 feet tone.	12—Mixture	III ranks.
5—Quint	$5\frac{1}{3}$ feet.	13—Posaune	8 feet.
6—Octave	4 feet.	14—Clarion	4 feet.
7—Wald Flute	4 feet.	15—Cremona	8 feet tone.
8—Twelfth	$2\frac{2}{3}$ feet.		

Swell, 12 Stops.

16—Double Open Diapason	16 feet.	22—Twelfth	$2\frac{2}{3}$ feet.
17—Open Diapason	8 feet.	23—Fifteenth	2 feet.
18—Salicional	8 feet.	24—Sesquialtera, III ranks	$1\frac{3}{5}$ foot.
19—Stopped Diapason	8 feet tone.	25—Oboe	8 feet.
20—Octave	4 feet.	26—Cornopean	8 feet.
21—Suabe Flute	4 feet.	27—Clarion	4 feet.

Pedal, 3 Stops.

28—Open Diapason	16 feet.	30—Trombone	16 feet.
29—Octave	8 feet.		

Couplers.	Compass.
1—Swell to Great.	Great, CC to f^3 in alt.
2—Great to Pedal.	Swell, CC to f^3 in alt.
3—Swell to Pedal.	Pedal, CCC to Tenor e.

244. Lancaster.

The Organ in St. Thomas's Church, Lancaster, was the noble gift of the Rev. Colin Campbell to his Church and to its Congregation. It was built by Banfield, of Birmingham, and is an extensive instrument, consisting of 35 Sounding Stops, comprising 3 complete Manuals, and an independent Pedal of 4 Stops. The Organ is enclosed in a very beautiful case of oak, made by Hatch, of Lancaster, from a design by Messrs. Sharpe and Paley, the Architects.

The Pedal Clavier is made on the radiating principle ; and the doors which close up the Organ are furnished with plate glass panels. The Specification of the above-named Organ is as follows :

Great, 11 Stops.

	Pipes.	Feet.
1—Open Diapason	54	8
2—Open Diapason	54	8
3—Clarabella	54	8
4—Stop Diapason	54	8 tone.
5—Principal	54	4
6—Twelfth	54	$2\frac{2}{3}$
7—Fifteenth	54	2
8—Sesquialtera, III rks.	162	$1\frac{3}{5}$
9—Mixture...II rks.	108	$\frac{2}{3}$
10—Trumpet	54	8
11—Clarion	54	4
		756

Choir, 9 Stops.

	Pipes.	Feet.
12—Dulciana, through	54	8
13—Keraulophon	42	8
14—Stop Diapason, Treble	42	8 tone.
15—Stop Diapason, Bass.	12	8 tone.
16—Principal	54	4
17—Celestiana	54	4
18—Flute	54	4
19—Ottevena	54	2
20—Cremona	35	8 tone.
		401

Swell, 11 Stops.

	Pipes.	Feet.
21—Double Diapason, CCC	54	16
22—Open Diapason	54	8
23—Stop Diapason	54	8 tone.
24—Principal	54	4
25—Twelfth	54	$2\frac{2}{3}$
26—Fifteenth	54	2
27—Mixture—III ranks	162	$1\frac{3}{5}$
28—Horn	54	8
29—Trumpet	54	8
30—Hautboy	54	8
31—Clarion	54	10
		702

Pedal, 4 Stops.

	Pipes.	Feet.
32—Grand Open Diapason	29	16
33— Bourdon	29	16 tone.
34— Principal	29	8
35— Grand Mixture, III ranks	87	
		174

Making a total of 2033 pipes.

Couplers.

Great Organ to Pedals.	Swell to Choir.
Choir Organ to Pedals.	Swell and Choir to Great.
Swell Organ to Pedals.	Great to Swell Sub-octave.
Pedal Organ in Octaves.	Great to Choir Sub-octave.
Swell to Great.	

245. Carlisle.

The old Organ in the Cathedral at Carlisle had but 1 Manual, ranging from GG to e^3 in alt, and furnished with the following 9 Stops :

Manual.

	Pipes.
1—Open Diapason	25
2—Stopped Diapason	53
3—Principal	53
4—Recorder	53
5—Twelfth	53
6—Fifteenth	53
7—Tierce	53
8—Sesquialtera, III ranks	159
9—Cornet, IV ranks	100
	602

The above instrument was removed in 1806, to make way for the present one by Avery, containing 17 Stops; and which was opened on the Easter Sunday of the year just mentioned. The following is a list of the contents of the present Organ:

Great, 8 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera, III ranks.
7—Cornet, III ranks.
8—Trumpet.

Choir, 4 Stops.

9—Stopped Diapason.
10—Dulciana to Fiddle g, grooved into Stopped Diapason below.
11—Principal,
12—Flute.

Swell, 5 Stops.

13—Open Diapason.
14—Stopped Diapason.
15—Principal.
16—Cornet, III ranks.
17—Hautboy.

Couplers.

Great and Choir, GG to d^3 in alt.
Swell, Fiddle g to d^3 in alt.
An Octave and a half of Pedals.

246. Newcastle-on-Tyne.

The Organ in St. Nicholas's Church, Newcastle-on-Tyne, was built by the elder Harris, about the year 1670. Compass of the Manuals, GG to C, 53 notes.

The Great Organ contained Open and Stopped Diapasons, two Principals, Twelfth and Fifteenth, Tierce, Sesquialtera (II ranks), Mixture (III ranks), mounted Cornet (V ranks), Trumpet treble, Trumpet bass. The Choir Organ contained Open and Stopped Diapasons, Flute, 12th treble to c, and 15th.

In 1767, the Swell was added by Snetzler, and contained Dulciana, Stopped Diapason, Hautboy, Trumpet, and Cornet (III ranks): Compass, down to G below middle C.

In August, 1814, the Organ was taken down by Wood, Small, and Co. of Edinburgh, who added a Double Diapason on the Keys from fiddle G downwards; a new set of Keys, extending the Manuals up to F; $1\frac{1}{2}$ Octave Pedals; and repaired the whole instrument.

In December, 1839, Mr. Bruce, who succeeded Wood, Small, and Co., added Copula Stops, Swell to Great and Choir to Great, Pedals to Great; enlarged the scale of the double Diapason, took them off the keys and placed them on a pedal wind-chest; enlarged the Swell box, carrying all, excepting the Hautboy, down to Gamut G, and converting the Cornet into Principal, 12th and 15th, and added a new bellows.

In December, 1845, Mr. Nicholson, of Newcastle-on-Tyne, made the greatest alterations; the Organ was cut through the centre, and the west-front moved about 3 feet, to make room for a new pedal wind-chest, to contain 3 Stops. He made an entirely new Swell box; replaced the pipes added by Bruce with new ones more in character with those of Snetzler, adding an Open Diapason and Cornopean. The

pedal pipes were considerably enlarged in scale and carried up to E; new Pedals were laid down; a Double Reed was added to the Pedal Organ; the 12th in the Choir was taken out and a Cremona inserted; one of the Principals in the Great Organ was made into an Open Diapason; and a separate new bellows for the Pedal Organ was inserted.

The Organ at present contains the following Stops:

Great, 12 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopt Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Tierce.
8—Sesquialtera . . .II ranks.
9—Mixture . . . . .III ranks.
10—Cornet . . . . . V ranks.
11—Trumpet, treble.
12—Trumpet, bass.

Choir, 5 Stops.

13—Open Diapason.
14—Stopped Diapason.
15—Flute.
16—Fifteenth.
17—Cremona.

Swell, 9 Stops.

18—Dulciana.
19—Open Diapason (to be made into Tenoroon).
20—Stopped Diapason.
21—Principal.
22—Twelfth (to be made into a Mixture, II ranks).
23—Fifteenth.
24—Hautboy.
25—Cornopean.
26—Trumpet (to be made into a Clarion).

Pedal, 2 Stops.

30—Open Diapason, CCC to E.
31—Trumpet, CCC to E.

Copulas.

1—Swell to Great.
2—Choir to Great.
3—Pedals to Great.
4—Pedals to Choir.

The Open Diapasons, though not powerful, are very good; the Stopped Diapasons are exceedingly beautiful; the Flute is a very fine stop; and the Mixtures are very brilliant. The Great Organ Trumpet in the bass requires an octave of new pipes, the old ones being much broken. The whole of the Swell is exceedingly good, and the instrument altogether most effective. The whole of the later alterations and additions were made at the suggestion and under the direction of the present Organist, Dr. Ions.

147. Durham.

The Organ in Durham Cathedral was built by Father Schmidt, in 1684-5, and, as left by him, had 2 Manuals, GG to d^3 in alt, and 17 Stops, 1068 pipes. For its construction he received £700, and the materials of the old Organ. The instrument was repaired by Abraham Jordan, in 1748, who is supposed to have added the Swell. The painting and gilding of the pipes cost, in addition, £50. In 1815, Mr. England repaired the Organ; and it was completed by his son-in-law, Nicholls. He added a Principal and Cornet to the Swell, a Cremona to the Choir Organ, new keys, and extended the Compass by two semitones in the treble; he also added

seventeen dwarf Pedals and the same number of Pedal Pipes. The Organ was again repaired by Mr. Buckingham, in 1823; and in 1840 he put in a Venetian Swell Movement, new Bellows, and a Coupler Movement. In 1844, Mr. Bishop made considerable alterations to the Organ, by extending the compass of the Swell to Tenor c, and placing a Clarion in room of the Cornet. He also added the Composition Pedals, a new Sesquialtera, Mixture, Twelfth, and Tierce; a new Stopped Diapason and Dulciana in the Choir Organ; a Claribella to Great Organ, in place of the Cornet; double Pedal Pipes, and two octaves of German Pedals. And, in 1847, Mr. Bishop moved the Organ to its present site, on the north side of the Choir, when he put a new Hautboy Stop in the Swell.

The Great Organ Case is 18 feet 6 inches wide by 4 feet 8 inches in depth, and about 32 feet in height; the Choir Case is 9 feet in width by 3 feet in depth.

Great, 12 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Claribella, in place of V-rank Cornet.
5—Principal.
6—Flute.
7—Twelfth.
8—Fifteenth.
9—Tierce.
10—Sesquialtera, III ranks.
11—Trumpet.
12—Double Diapason, GG to Fiddle g, two octaves above.

Choir, 7 Stops.

13—Dulciana.
14—Stopped Diapason.
15—Principal.
16—Dulciana Principal.
17—Flute, metal throughout.
18—Fifteenth.
19—Cremona.

Swell, 6 Stops.

20—Open Diapason.
21—Stopped Diapason.
22—Principal.
23—Trumpet.
24—Hautboy.
25—Clarion.

Pedal, 1 Stop.

26—Double Open Diapason, two Octaves.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Great to Pedal.
3—Choir to Pedal.
4 to 7—Four Composition Pedals.

Compass.

Great, CC to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Tenor c to e^3 in alt.
Pedal, two octaves.

248. York.

The Organ in York Cathedral, originally built by Messrs. Elliott and Hill, from the plans of Dr. Camidge, has undergone several alterations, additions, and transpositions since its first erection in 1829. It contains 80 Stops and 8,000 Pipes; and cost about £5,000, including the original gift of £3,000 by the late Earl of Scarborough, who was the senior Prebendary of the Cathedral at the time the first fire occurred. His Lordship dying before the instrument was completed, the remaining £2,000 were furnished by the Chapter, assisted by subscriptions from the neighbouring Nobility, Clergy, and Gentry. The Great Manual contains 4,818 Pipes; the Swell Organ, 1,856; the Choir Organ, 1,399; and the Pedal Organ, 200 Pipes.

The Pipes of all the Stops are of metal, excepting those particularized as being of wood. By means of a Coupler, the two lowest octaves of the Swell Organ form the upper portion of the Pedal Organ.

Great Manual, CCC to CCC.

The West Organ, 6 Octaves.

1—Bourdon, wood, stopped..... 16 feet.
2—Bourdon, large, open 16 feet.
3—Open Diapason .... 8 feet.
4—Large metal Principal 8 feet.
5—German Flute, wood, open..... 8 feet.
6—Octave Open Diapason 8 feet.
7—Principal ..... 8 feet.
8—Twelfth ..... 6 feet.
9—Fifteenth ..... 4 feet.
10—Sesquialtera, III ranks, and Mixture of IV ranks, } 7 ranks.
11—Flute Principal .... 8 feet.
12—Fifteenth ..... 4 feet.
13—Tierce ..... 3½ feet.
14—Larigot ..... 3 feet.
15—Super Octave..... 2 feet.
16—Octave Principal .. 4 feet.
17—Cymbal, VII ranks.
18—Posaune ..... 16 feet tone.
19—Trumpet..... 16 feet.
20—Shawn ..... 8 feet.

The East Organ, 6 Octaves.

1—Bourdon, wood, stopped..... 16 feet.
2—Great Open Diapason 16 feet.
3—Open Diapason .... 16 feet.
4—Octave Open Diapason 8 feet.
5—Harmonica, wood, open..... 8 feet.
6—Great Principal .... 8 feet.
7—Octave Principal.... 4 feet.
8—Twelfth ..... 6 feet.
9—Fifteenth ..... 4 feet.
10—Sesquialtera, III ranks. and Mixture of IV ranks. } 7 ranks.
12—Principal..... 8 feet.
12—Fifteenth..... 4 feet.
13—Tierce ..... 3½ feet.
14—Larigot ..... 3 feet.
15—Super Octave..... 2 feet.
16—Flute, Principal.... 8 feet.
17—Great Cornet of X, IX, and VIII ranks.
18—Bassoon ..... 16 feet.
19—Clarionet ..... 16 feet.
20—Clarion ..... 8 feet.

Tuba Mirabilis Organ.

1—Grand Ophicleide .. 16 feet.
2—Cornopean..... 16 feet.

Swell, 5 Octaves.

3—Viola ..... 8 feet.
4—Dulciana..... 8 feet.
5—Open Diapason .... 8 feet.
6—Philomela, wood, open 8 feet.
7—Celestina ..... 8 feet.
8—Octave Diapason.... 8 feet.
9—Dulcet, wood, open.. 4 feet.
10—Principal ..... 4 feet.
11—Flageolet ..... 4 feet.
12—Twelfth ..... 3 feet.
13—Fifteenth ..... 2 feet.
14—Cornet ..... 5 feet.
15—Scherp..... 3 feet.
16—Horn ..... 8 feet.
17—Cremona ..... 8 feet.
18—Trumpet ..... 8 feet.
19—Hautboy..... 8 feet.
20—Dulciana ..... 8 feet.

Choir, 6 Octaves.

1—Stopped Diapason, wood ..... 16 feet.
2—Dulciana..... 16 feet.
3—Claribella, wood, open 8 feet.
4—Open Diapason .... 16 feet.
5—Principal ..... 4 feet.
6—Ophicleide Diapason.. 16 feet.
7—Wald Flute ..... 8 feet.
8—Octave..... 4 feet.
9—Corno Bassetto..... 16 feet.
10—Keraulophon..... 8 feet.
11—Twelfth, .. Mixture, V ranks.
15—Fifteenth, Mixture, IV ranks.

Pedal—two Octaves, CCCC to CC.

1—Bombarde (4-ft. diagonal)..... 32 feet.
2—Bombarde (2½-ft. diagonal)..... 16 feet.
3—Double Diapason (2-ft. diameter) ..... 32 feet.
4 - Double Principal (16 inches diameter).. 16 feet.
5—Sub-bass (wood, 2½-ft. diagonal)..... 32 feet.
6—Double Bass (wood, 2-ft. diagonal).... 16 feet.
7—Sacbut (wood)..... 32 feet.
8—Trombone..... 16 feet.

249. Doncaster.

The Organ that stood in the Parish Church of St. George, at Doncaster, previous to its destruction by fire, was so magnificent and in some respects unique an instrument as to merit some passing notice. Its "foundation" was an unusually fine specimen of the united work of the younger Harris and Byfield, which was remarkable alike for the freshness and the beauty of its tone. It originally consisted of 23 Stops, all of which had been retained on account of their surprising quality. In the following account, the old Stops are distinguished by asterisks. The two Open Diapasons in the Great Organ were mellow and pure; the Stopped Diapasons, of which there were four, all of metal, and to different scales and varied proportions, were clear, liquid, and resonant; the Reeds were full, penetrating, and arresting; and the Compound Stops brilliant, ringing, and full of vivacity. The instrument had been enlarged at different periods: by Donaldson, of York, in 1802; Mr. Buckingham, of London, in 1822; Mr. Ward, of York, about twenty years since; and after that, by Mr. Brown, of Doncaster, who added the large Swell and the back Great Organ. At the time of the conflagration, the Organ was being partly remodelled and re-erected (in a side Chapel), by Hill, under the direction of Mr. Jeremiah Rogers, the Organist to the Church, and was, previous to its removal, one of the finest instruments in the kingdom. It was the first Organ erected in this country in which the Continental principle was carried out in its amplitude and integrity, of placing three *complete* 16-feet or Double Stops, and a Quint of 5⅓ feet, on the Great Manual; and which comprehensive arrangement has not been followed in any other Organ of English manufacture up to the present time. The Doncaster Organ had 50 Sounding Stops, distributed among four distinct departments; the Great Organ was a "16-feet Manual," in the German acceptation of the term, the tone of which was supported by a "32-feet Pedal." The following was its disposition:

Great, 20 Stops.

1—Double Open Diapason, 16 feet.
2—Double Stopped Diapason..... 16 feet tone.
*3—Open Diapason, front. 8 feet.
*4—Open Diapason .... 8 feet.
*5—Stopped Diapason .. 8 feet tone.
6—Quint..... 5⅓ feet.
*7—Principal.. ..... 4 feet.
8—Principal.. ..... 4 feet.
*9—Twelfth..... 2⅔ feet.
*10—Fifteenth ..... 2 feet.
*11—Tierce..... 1⅗ foot.
*12—Sesquialtera, V rnks. 1⅓ foot.
13—Mixture.. II rnks.
14—Furniture, II rnks.
15—Sharp....IV rnks.
*16—Cornet, mounted, V rnks.
17—Double Trumpet .. 16 feet.
*18—Trumpet..... 8 feet
*19—Trumpet ..... 8 feet.
*20—Clarion..... 4 feet.

Choir, 8 Stops.

*21—Stopped Diapason..	8 feet tone.	*25—Fifteenth.....	2 feet.
22—Dulciana.....	8 feet.	26—Cremona..... ..	8 feet tone.
*23—Principal	4 feet.	*27—Bassoon	8 feet.
*24—Flute	4 feet.	*28—Vox Humana	8 feet tone.

Swell, 15 Stops.

29—Bourdon	16 feet tone.	37—Mixture, III rnks.	
*30—Open Diapason....	8 feet.	38—Double Trumpet..	16 feet.
*31—Stopped Diapason..	8 feet tone.	39—Horn, large scale..	8 feet.
*32—Principal.....	4 feet.	40—Cornopean	8 feet.
33—Flute	4 feet.	*41—Trumpet.....	8 feet.
34—Twelfth	$2\frac{2}{3}$ feet.	*42—Hautboy.....	8 feet.
35—Fifteenth.....	2 feet.	43—Clarion.....	4 feet.
36—Sesquialtera, III rnks.			

Pedal, 7 Stops.

44—Great Open Bass Diapason, wood ..	32 feet.	47—Principal, metal....	8 feet.
		48—Fifteenth, metal....	4 feet.
45—Open Diapason, wood	16 feet.	49—Posaune, metal	16 feet.
46—Sub-bass, wood	16 feet tone.	50—Trumpet, metal....	8 feet.

Compass.

Great, old work, GG to f^3 in alt.	Swell, CC to f^3 in alt.
Great, new work, CC to f^3 in alt.	Pedal, CCC to Tenor d.
Choir, GG to f^3 in alt.	

As the new Parish Church is being rebuilt on a scale of even greater magnificence than that which rendered the former structure so famous, owing to the munificence of the residents of the town and neighbourhood, it is fully anticipated that the townspeople of Doncaster will exhibit the same generous spirit in regard to their new Organ, by securing at least as fine an instrument for their Organist; who, in expending the funds which their liberality placed at his disposal from time to time, spared neither his own trouble nor private means in bringing their former noble instrument to such perfection.

250. Lincoln Cathedral.

The Organ in Lincoln Cathedral was built in 1826, by W. Allen; and extended by his son, Charles Allen, in 1851.

Great, 11 Stops.

Compass of Great and Choir Organs, from GG to F in alt.

1—Large Open Diapason.	7—Fifteenth.
2—Small Open Diapason.	8—Cornet, treble,....IV ranks.
3—Stopped Diapason.	9—Sesquialtera, bass, III ranks.
4—Clarabella.	10—Trumpet, treble.
5—Principal.	11—Trumpet, bass.
6—Twelfth.	

Choir, 5 Stops.

2—Stopped Diapason.	15—Principal.
3—Dulciana.	16—Flute.
4—Viol di Gamba.	17—Fifteenth.

Swell, 7 Stops—Gamut to F in alt.

18—Double Diapason.
19—Open Diapason.
20—Stopped Diapason.
21—Principal.
22—Flute.
23—Twelfth.
24—Fifteenth.
25—Hautboy.
26—Horn.

Pedal, 7 Stops.

27—Sub-Bourdon . . . . . 32 feet tone.
28—Open Diapason . . . . 16 feet.
29—Principal . . . . . 8 feet.
30—Twelfth . . . . . 6 feet.
31—Fifteenth. . . . . 4 feet.
32—Sesquialtera.
33—Trombone . . . . . 16 feet.

Accessory Stops, Movements, &c.

1—Swell to Great.
2—Swell to Choir.
3—Pedal to Great.
4—Swell to Choir
5 to 9—Five Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Gamut G to f^3 in alt.
Pedal Clavier, CCC to Fiddle g.

Pedal Stops, Nos. 27 and 28, CCC to Fiddle g: Nos. 29 to 33, CCC to FFF ♯, seven semitones, to meet Great Organ at GG.

251. Boston.

The large Organ in the Centenary Chapel, Boston, Lincolnshire, was built by Gray and Davison, in the year 1850. It has Great and Choir Manuals, from CC, 8 feet, to F in alt; the Pedal Organ, two octaves and a fourth; Compass, from CCC, 16 feet, to Tenor F. The whole of the Stops in this, as well as in the Manuals, except the Keraulophon and Clarionet Flute, go throughout. The Swell is to Tenor C.

There are two Bellows—one for the Manuals, the other for the Pedal Organ; and four Composition Pedals; also the new and effective Sforzando Pedal.

The sides, as well as the front of the Case, contain Speaking Pipes; and the dimensions of the instrument are—twenty-six feet high, twenty-three feet wide, and eighteen feet deep.

There are forty-nine Stops, and two thousand four hundred and ninety Pipes.

Great, 14 Stops.

1—Double Open Diapason 16 feet.
2—Open Diapason . . . . 8 feet.
3—Open Diapason . . . . 8 feet.
4—Stopped Diapason . . 8 feet.
5—Quint. . . . . 6 feet.
6—Octave . . . . . 4 feet.
7—Flute . . . . . 4 feet.
8—Octave Quint . . . . . 3 feet.
9—Super Octave . . . . . 2 feet.
10—Flageolet . . . . . 2 feet.
11—Sesquialtera, III ranks.
12—Furniture . . III ranks.
13—Posaune . . . . . 8 feet.
14—Clarion . . . . . 4 feet.

Choir, 12 Stops.

15—Open Diapason . . . . 8 feet.
16—Gamba . . . . . 8 feet.
17—Keraulophon . . . . . 8 feet.
18—Stopped Diapason, bass 8 feet.
19—Clarionet Flute . . . . 8 feet.
20—Octave . . . . . 4 feet.
21—Flute . . . . . 4 feet.
22—Gemshorn . . . . . 4 feet.
23—Super Octave . . . . . 2 feet.
24—Flageolet . . . . . 2 feet.
25—Sesquialtera, III ranks.
26—Corno di Bassetto . . . 8 feet.

Swell, 10 Stops.

27—Bourdon..... 16 feet.
28—Open Diapason .... 8 feet.
29—Stopped Diapason... 8 feet.
30—Octave..... 4 feet.
31—Super Octave ..... 2 feet.
32—Sesquialtera, III ranks.
33—Contra Fagotto .... 16 feet.
34—Cornopean ..... 8 feet.
35—Oboe..... 8 feet.
36—Clarion ..... 4 feet.

Pedal, 6 Stops.

37—Grand Open Diapason 16 feet.
38—Grand Violon..... 16 feet.
39—Grand Bourdon .... 16 feet.
40—Grand Octave..... 8 feet.
41—Grand Super Octave. 4 feet.
42—Grand Trombone... 16 feet.

Couplers.

43—Swell to Great Manual.
44—Choir to Great Manual.
45—Swell to Choir Manual.
46—Swell Manual to Pedals.
47—Great Manual to Pedals.
48—Choir Manual to Pedals.
49—Sforzando Pedal.

252. Newark.

The fine Organ in the Church of Newark-upon-Trent was originally built by G. England, in the year 1804; and was at first of FFF compass. The Great Manual, however, has recently been reconstructed, to the German compass, by Foster and Andrews, of Hull; who have, to a great extent, re-modelled the instrument, under the direction of the present Organist, Dr. Dearle. All the Stops that the Organ is designed to contain are not yet in; but, when they are so, the Specification will be as follows:

Great, 13 Stops.

1—Bourdon { or Double } 16 feet.
2—Tenoroon { Diapason. }
3—Small Open Diapason. 8 feet.
4—Large Open Diapason. 8 feet.
5—Stopped Diapason... 8 feet tone.
6—Claribella..... 8 feet.
7—Principal..... 4 feet.
8—Twelfth..... 2⅔ feet.
9—Fifteenth..... 2 feet.
10—Sesquialtera, III ranks.
11—Mixture.... II ranks.
12—Trumpet..... 8 feet.
13—Clarion..... 4 feet.

Choir, 8 Stops.

14—Dulciana..... 8 feet.
15—Stopped Diapason... 8 feet.
16—Principal..... 4 feet.
17—Flute..... 4 feet.
18—Fifteenth..... 2 feet.
19—Mixture..II ranks.. 1⅓ foot.
20—Bassoon..... 8 feet.
21—Cremona..... 8 feet tone.

Swell, 11 Stops.

22—Double Diapason... 16 feet.
23—Open Diapason.... 8 feet.
24—Stopped Diapason .. 8 feet tone.
25—Viol di Gamba.... 8 feet.
26—Principal..... 4 feet.
27—Fifteenth..... 2 feet.
28—Sesquialtera, III ranks.
29—Horn..... 8 feet.
30—Trumpet..... 8 feet.
31—Cornopean..... 8 feet.
32—Clarion..... 4 feet.

Solo, 6 Stops.

33—Harmonic Flute.... 8 feet.
34—Clarionet Flute.... 8 feet tone.
35—Claribella..... 8 feet.
36—Hautboy..... 8 feet.
37—Corno di Bassetto... 8 feet tone.
38—Tuba Mirabilis.... 8 feet.

Pedal, 6 Stops.

39—Large Open . . . . . 16 feet.
40—Bourdon . . . . . 16 feet tone.
41—Principal . . . . . 8 feet.
42—Fifteenth . . . . . 4 feet.
43—Mixture.
44—Trombone . . . . . 16 feet.

Accessory Stops, Movements, &c.

1 to 7—Seven Couplers.
8 to 11—Four Pneumatic Composition Pedals.

Compass.

Great, CC to f^3 in alt.
Choir, FFF to f^3 in alt.
Swell, CC to f^3 in alt.
Solo, Tenor c to f^3 in alt.
Pedal, CCC to Tenor f.

253—Southwell.

The Organ in Southwell Collegiate Church was originally built by Father Schmidt; but, having been damaged by fire, it was admirably repaired and completed by Snetzler, whose bill, dated January, 1766, is now in possession of the Chapter. Compass of Great and Choir Organs, from GG to d^3 in alt; of the Swell, from Fiddle g to d^3 in alt; and of the Pedal Clavier, GG to Tenor c. The general effect of the instrument is excellent, considering the smallness of the number of its Stops; and the Diapasons are very fine.

Great, 8 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera, III ranks.
7—Trumpet.
8—Cornet to Middle c^1, V ranks.

Choir, 5 Stops.

9—Stopped Diapason.
10—Dulciana to Gamut G.
11—Principal.
12—Flute.
13—Fifteenth.

Swell, 4 Stops.

14—Open Diapason.
15—Stopped Diapason.
16—Principal.
17—Fifteenth.

254. Nottingham.

St. Mary's Church, Nottingham, contains a most excellent Organ by Snetzler, containing 23 Sounding Stops, among which are three Metal Open Diapasons down to GG. The following is a list of its Stops:

Great, 10 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera. . . . . IV ranks.
8—Cornet to Middle c^1 . . V ranks.
9—Trumpet.
10—Clarion.

Choir, 6 Stops.

11—Open Diapason.
12—Stopped Diapason.
13—Principal.
14—Flute.
15—Fifteenth.
16—Bassoon.

Swell, 6 Stops.

17—Open Diapason.
18—Stopped Diapason.
19—Principal.
20—Cornet..III ranks.
21—Trumpet.
22—Hautboy.

Pedal, 1 Stop.

23—Open Diapason, Gamut G to CCC..16 feet length.

Compass.

Great, GG to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Tenor c to e^3 in alt.
Pedal Clavier, GG to Fiddle g.

Couplers.

Swell to Great.
Great to Pedal.
Choir to Pedal.

255. Nottingham.

The Organ in the Mechanics' Hall, Nottingham, was built by Bevington and Sons, in the year 1849. It originally had 45 Sounding Stops, to which 8 have since been added by Groves, of London, who removed the Choir and Swell Organs from inside the case to ante-rooms underneath the Orchestra. He also arranged the Organ on the direct action principle; i. e. placed the Great Organ Sound-board so that its sliders run parallel with the keys, and are therefore brought under control by a simple and direct Draw-stop action. The following is an enumeration of the Stops.

Great, 18 Stops.

1—Tenoroon	16 feet.	10—Waldflute	4 feet.
2—Bourdon, to meet No. 1	16 feet tone.	11—Decima	$3\frac{1}{5}$ feet.
3—Open Diapason	8 feet.	12—Twelfth	$2\frac{2}{3}$ feet.
4—Open Diapason	8 feet.	13—Fifteenth	2 feet.
5—Stopped Diapason	8 feet tone.	14—Sesquialtera, III rnks.	$1\frac{3}{5}$ foot.
6—Clarabella	8 feet.	15—Mixture. III rnks.	$\frac{4}{5}$ foot.
7—Hohlflute	8 feet.	16—Posaune	8 feet.
8—Quint	$5\frac{1}{3}$ feet.	17—Trumpet	8 feet.
9—Principal	4 feet.	18—Octave Trumpet	4 feet.

Choir, 13 Stops.

19—Double Stopped Diapason	16 feet tone.	25—Clarabella	8 feet.
20—Open Diapason	8 feet.	26—Principal	4 feet.
21—Stopped Diapason	8 feet tone.	27—Flute	4 feet.
22—Dulciana	8 feet.	28—Flageolet	2 feet.
23—Viol di Gamba	8 feet.	29—Double Bassoon	16 feet.
24—Keraulophon	8 feet.	30—Oboe	8 feet.
		31—Clarionet	8 feet tone.

Swell, 15 Stops.

32—Great Double Diapason	32 feet tone.	40—Fifteenth	2 feet.
33—Double Diapason	16 feet tone.	41—Piccolo	2 feet.
34—Open Diapason	8 feet.	42—Octave Fifteenth	1 foot.
35—Open Diapason	8 feet.	43—Furniture, V ranks	$1\frac{3}{5}$ foot.
36—Stopped Diapason	8 feet tone.	44—Trombone	16 feet.
37—Quint	$5\frac{1}{3}$ feet.	45—Cornopean	8 feet.
38—Octave	4 feet.	46—Hautboy	8 feet.
39—Wald Flute	4 feet.	47—Clarion	4 feet.
		48—Octave Clarion	2 feet.

Pedal, 5 Stops.

49—Open Diapason, wood 16 feet.	52—Fifteenth..... 4 feet.
50—Open Diapason, metal 16 feet.	53—Trombone..... 16 feet.
51—Principal.....wood 8 feet.	

Accessory Stops, Movements, &c.

1 to 4, Four Couplers.	5 to 12, Eight Composition Pedals.

Compass.

Great, CC to g^3 in altissimo.	Swell, Tenor c to g^3 in altissimo.
Choir, CC to g^3 in altissimo.	Pedal, CCC to Tenor d.

256. Peterborough.

The present Organ in Peterborough Cathedral was built by William Allen, of London, and was opened in June, 1809. It cost 500 guineas and the old Organ; of which the Case and both Open Diapasons from middle d^1 downwards were retained.

Great, 10 Stops.

1—Open Diapason.	6—Twelfth.
2—Open Diapason.	7—Fifteenth.
3—Stopped Diapason.	8—Sesquialtera, Bass, IV ranks.
4—Principal.	9—Cornet..... IV ranks.
5—Flute.	10—Trumpet.

Choir, 6 Stops

11—Stopped Diapason.	14—Flute.
12—Dulciana.	15—Fifteenth.
13—Principal.	16—Cremona.

Swell, 6 Stops.

17—Open Diapason.	20—Twelfth.
18—Stopped Diapason.	21—Fifteenth.
19—Principal.	22—Trumpet.

257. Lynn Regis.

The old Organ at St. Margaret's, Lynn Regis, Norfolk—partly the work of Dallans, and partly the production of some more ancient workman—was given to the Church by "John Tinner," in 1679. The present fine instrument was built by the celebrated Snetzler, under the direction of Dr. Burney, in the year 1754. It is the largest instrument Snetzler ever made in England; it slightly exceeding in this respect his other celebrated piece of handiwork at Halifax. The Lynn Organ originally contained a III-rank Furniture in the Great Organ, *in addition* to the IV-rank Sesquialtera (as at Halifax); also a separate Tierce, and a Bourdon, *in metal*, to CC, excepting the two lowest Pipes, which were of wood. These three Stops were at some time cancelled, and a second Open Diapason, Principal, and Fifteenth placed in their stead; a Clarabella has also been inserted in the Choir Organ, in place of the Vox Humana. In the Swell, there were originally three unison Reeds (Hautboy, Trumpet, and French Horn); but there are now but two. The Organ was repaired in 1796, by Lincoln; and underwent a second renovation

in 1816. About eight years since, it received the important addition of a Pedal Diapason, to GGG, which was added by Holdich, of London. The Organ now contains 27 Sounding Stops, of which the following is a list:

Great, 12 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Fifteenth.
9—Sesquialtera ..IV ranks.
10—Cornet to c^1, .. V ranks.
11—Trumpet.
12—Clarion.

Choir, 7 Stops.

13—Dulciana.
14—Stopped Diapason.
15—Clarabella.
16—Principal.
17—Flute.
18—Fifteenth.
19—Bassoon up to middle g1.

Swell, 7 Stops.

20—Open Diapason.
21—Stopped Diapason.
22—Principal.
23—German Flute.
24—Cornet..IV ranks.
25—Trumpet.
26—Hautboy.

Pedal, 1 Stop.

27—Open Diapason, to GGG..21⅓ feet length.

Couplers.

Swell to Great.
Pedals to Great.
Pedals to Choir.

Compass.

Great, GG to e^3 in alt.
Choir, GG to e^3 in alt.
Swell, Tenor f to e^3 in alt.
Pedals, down to GG.

The Swell Clavier descends to GG, and acts on the Bass of the Choir Stopped Diapason, Dulciana, and Flute, below Tenor f, which are made to draw separately and independently for that purpose, whereby the apparent number of Sounding Stops is increased from 27 to 30.

This is the first English Organ that had a Dulciana; a Stop that, in this example, runs through to GG in metal.

258. Norwich.

The Organ in Norwich Cathedral has an elaborately carved Gothic oak case; it stands over the screen, and consequently has a double front, containing, in the western, the open Diapason (said to be of Harris's make), and, in the choir front, an open Diapason of Byfield's. The tone of the instrument is of fine quality; and, although it is not so powerful as many of the Organs recently built, it is inferior to none in general effect. The Organ underwent a considerable change some years since, in being removed to its present situation, when the Choir Organ was taken from its usual position and placed on the south side of the instrument, and the Swell Organ on the opposite side, both being on a level with the base of the Great Organ, and unseen from the Choir. At this time, Double Diapason Pedal Pipes, down to GGG, were added by Bishop, and located on the north side of the building, under

the triforium, having separate bellows and a long movement. The instrument contains :

Great, 10 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Clarabella, in place of V-rank Cornet.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Tierce.
9—Sesquialtera.
10—Trumpet.

Choir, 6 Stops.

11—Dulciana to Tenor C.
12—Stopped Diapason.
13—Principal.
14—Stopped Flute.
15—Fifteenth.
16—Cremona to Tenor f.

Swell, 5 Stops.

17—Open Diapason.
18—Stopped Diapason.
19—Principal.
20—Hautboy.
21—Trumpet.

Pedal, 1 Stop.

22—Open Diapason to GGG .. 21⅓ feet length.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Great to Pedal.
3—Coupler, Choir to Pedal.
4, 5, 6—Three Composition Pedals.

Compass.

Great, GG to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Tenor c to f^3 in alt.
Swell Clavier to GG, acting on Choir Organ below Tenor c.

259. Norwich.

The Organ in the Church of St. Peter Mancroft, Norwich, is a fine instrument; originally built by Harris, and afterwards repaired by England, who added the Dulciana to the Choir Organ, and put in a new Swell. The following is a list of its Stops, as drawn up by the late Mr. Russell.

Great, 12 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Tierce.
7—Larigot.
8—Sesquialtera, III ranks.
9—Mixture.... II ranks.
10—Furniture.. III ranks.
11—Cornet, mounted, to Middle c^1, V ranks.
12—Trumpet.

Choir, 8 Stops.

13—Dulciana to Gamut G.
14—Open Diapason to Tenor d.
15—Stopped Diapason to Tenor d.
16—Principal to Tenor d.
17—Flute.
18—Fifteenth.
19—Vox Humana throughout.
20—Bassoon throughout.

Swell, 6 Stops.

21—Open Diapason.
22—Stopped Diapason.
23—Principal.
24—Cornet, III ranks.
25—Hautboy.
26—Trumpet.

The Open Diapason, Stopped Diapason, and Principal in the Choir Organ, are borrowed from the corresponding Stops of the Great Organ, from Tenor d downwards.

260. Great Yarmouth.

The Organ in St. Nicholas Church, Great Yarmouth, is a particularly fine instrument. It was built by Jordan, Bridge, and Byfield, at a cost of £900, and was opened about the middle of December, 1733. It is enclosed in a handsome oak Case, 18 feet wide, 33 feet high to the top of the ornaments, and 7 feet deep. The Compass of the Great and Choir was originally from GG to d^3 in alt. omitting the low GG♯; the Swell went to Tenor c, and was enclosed in a box 7 feet in width. The metal for the Pipe-work was very fine, being nearly all tin; but the feet of the 15 large front Pipes settled down after a time, either from lack of strength in the first instance, the effect of the sea air, or some unascertained cause. In the year 1812, Mr. England, of Stephen Street, Tottenham Court Road, London, was employed to repair the Organ. He put in 15 new front Pipes; rounded out and repaired those inside; added 3 sets of new Manuals; fresh leathered the Bellows; applied an additional Wind-Trunk, the previous one being too small to supply the instrument fully; carried the Compass of the Manuals upwards from d^3 to f^3 in alt.; laid down an octave and a half of Pedals, from GG to Tenor c, with 17 Pipes connected with them—viz. 4 Unison Pipes from GG to BB♮, then 13 Double Pipes from CC to c; removed the old rattling Choir movement, consisting of backfalls, and introduced a tracker movement; cleaned the Organ, and regilt the front Pipes. For making these several improvements, Mr. England received 320 guineas.

In 1844, Mr. Gray applied a new Pedal Clavier, together with 18 large scale Pipes to GGG, with the necessary sound-board and movements; removed the 3 old Diagonal Bellows, and put in a pair of Horizontal Bellows, 12 feet long by 6 feet in breadth; replaced the lower octave of Pipes of the inner Open Diapason, which had settled down at the feet; substituted metal Pipes in the Choir Organ, from Gamut G upwards, in place of the wood Pipes of the Open Diapason, of which latter material that Stop had been at first exclusively formed; removed the *two* Vox Humanas from the Choir, and inserted a Cremona to Fiddle g; added an octave to the Bass of the Swell, and deepened the box, as well as widening it at the back by a foot to receive the larger Pipes; and substituted a III-rank Sesquialtera for the old III-rank Cornet. He also added a second set of Pallets to the lowest octave of the Great Organ Sound-board, whereby the supply of wind in the Bass was rendered far more ample and satisfactory. For these additions and improvements, Mr. Gray received £350.

Great, 13 Stops.

All the Stops throughout, except the Cornet.

1—Front Open Diapason.
2—Inside Open Diapason.
3—Stopped Diapason, metal Treble.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Tierce.
8—Sesquialtera .. V ranks.
9—Mixture .. .. III ranks.
10—Mounted Cornet, V ranks.
11—Trumpet.
12—Trumpet.
13—Clarion.

Choir, 7 Stops.

All the Stops throughout, except the Cremona.

14—Open Diapason, metal to Gamut G, wood from FF to GG.
15—Stopped Diapason, metal Treble.
16—Principal.
17—Stopped Flute, metal Treble.
18—Fifteenth.
19—Mixture, II ranks.
20—Cremona to Fiddle g.

Swell, 7 Stops.

21—Open Diapason.	24—Sesquialtera, III ranks.
22—Stopped Diapason, metal down to Tenor c.	25—French Horn.
	26—Trumpet.
23—Principal.	27—Clarion.

Pedal, 2 Stops.

28—Great Open Diapason, down to GGG, in wood . . . . . $20\frac{2}{3}$ feet length.
29—Small Open Diapason, to CCC, in wood . . . . . 16 feet length.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	3—Coupler, Choir to Pedal.
2—Coupler, Great to Pedal.	4, 5, 6—Three Composition Pedals.

The GG Open, in front, is 7 inches in diameter; the inside GG $7\frac{1}{4}$ inches.
England's CCC Pipe measures $7\frac{1}{2}$ inches by 9.
Gray's GGG, 21 inches by 19; the CC, 8 inches by 7.

261. Ely.

The Organ in Ely Cathedral, erected by Hill, in 1851, is placed in the triforium, and projects out from the arches about six feet. The keys are placed in a stone gallery, behind the top of the stalls, and communicate with the Organ by means of a long movement. The instrument is enclosed in a handsome Case, of oak, made according to a design prepared by Mr. Scott. The Organ contains:

Great, 13 Stops.

1—Double Diapason	16 feet.	8—Super Octave	2 feet.
2—Open Diapason	8 feet.	9—Sesquialtera, III ranks.	
3—Open Diapason	8 feet.	10—Mixture . . . . III ranks.	
4—Stopped Diapason	8 feet.	11—Posaune	8 feet.
5—Quint	6 feet.	12—Trumpet	8 feet.
6—Octave	4 feet.	13—Clarion	4 feet.
7—Octave Quint	3 feet.		

Choir, 7 Stops.

14—Open Diapason	8 feet.	18—Flute	4 feet.
15—Clarabella, throughout	8 feet.	19—Super Octave	2 feet.
16—Stopped Diapason	8 feet.	20—Cremona	8 feet.
17—Octave	4 feet.		

Swell, 6 Stops.

21—Double Diapason	16 feet.	24—Octave	4 feet.
22—Open Diapason	8 feet.	25—Trumpet	8 feet.
23—Stopped Diapason	8 feet.	26—Hautboy	8 feet.

Pedal, 6 Stops.

27—Open, wood	16 feet.	30—Super Octave	4 feet.
28—Open, metal	16 feet.	31—Sesquialtera, III ranks.	
29—Octave	8 feet.	32—Trombome	16 feet.

Accessory Stops, Movements, &c.

1—Swell to Great.	3—Pedals to Great.
2—Choir to Great	4—Pedals to Choir.

Compass.

Great, CC to f^3 in alt.	Swell, Tenor c, to f^3 in alt.
Choir, CC to f^3 in alt.	Pedal, CCC to Tenor d.

262. Cambridge.

The Organ in Trinity College was commenced by Father Smith, who, however, dying during its construction, it was voiced and tuned by his Son-in-law, Christopher Schrieder, in 1703. A Swell was afterwards added by Byfield, and a set of Pedal Pipes by Avery. Subsequently, Messrs. Flight and Robson effected considerable repairs, and also raised the pitch of the instrument, which had previously been very flat. An apparatus was also added to the Bellows for the purpose of steadying the wind, and which was the precursor of the more recent Concussion Bellows. The Organ was considerably enlarged by Gray, in 1834, who extended the Great Organ from the original GG or 10⅔ feet compass, to the CCC, or 16-feet compass. Since then, Hill has introduced a larger and far more effective Swell; and, still more recently, has put new Great Organ Sound-boards, the original ones, by Father Smith, having become crazy and decayed from age. These are so admirably constructed that the Pipes have now room to speak, instead of being inconveniently crowded, as they were before. Several new and effective Stops have also been introduced, while, by the transposition of others, the whole has been rendered far more brilliant and effective. The whole of these latter improvements were made under the direction of the present Organist, Dr. Walmisley. The instrument now contains 29 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Double Diapason, Open metal to the Gamut G key, Stopped to the CC key.
2—Open Diapason, down to CCC.
3—Stopped Diapason....to GG.
4—Gamba .....to CC.
5—Salicional .....to CC.
6—Quint.....to the CC key.
7—Principal, throughout.
8—Wald Flute.
9—Twelfth, throughout.
10—Fifteenth ..... throughout.
11—Sesquialtera ..III rks. throughout.
12—Mixture .... II rks. throughout.
13—Trumpet.....throughout.
14—Clarion..... .....throughout.

Choir, 6 Stops.

15—Open Diapason.
16—Stopped Diapason.
17—Dulciana.
18—Principal.
19—Flute.
20—Cremona.

Swell, 8 Stops.

21—Double Stopped Diapason.
22—Open Diapason.
23—Stopped Diapason.
24—Principal.
25—Sesquialtera, III ranks.
26—Oboe.
27—Trumpet.
28—Clarion.

Pedal, 1 Stop.

29—Sub Bourdon ..... 32 feet tone.

Accessory Stops, Movements, &c.

1—Great to Pedal, 16 feet pitch.
2—Great to Pedal, 8 feet pitch.
3—Choir to Pedal, 16 feet pitch.
4—Choir to Pedal, 2 feet pitch.
5—Swell to Great.
6—Tremulant.
7, 8, 9, 10—Four Composition Pedals.

Compass.

Great, CCC to f^3 in alt.
Choir, GG to f^3 in alt.
Swell, Gamut G to f^3 in alt.
Pedal, CCC to Tenor c, two octaves.

263. Cambridge.

The Organ in the Chapel of St. John's College, Cambridge, was built by Hill, in 1839. It is not completed, preparation being made for five more Stops, which will be added when the new Chapel is built.

Great, 10 Stops.

Compass, FFF to f^3 in alt.

1—Open Diapason.
2—Stopped Diapason.
3—Double Dulciana.
4—Principal.
5—Flute.
6—Claribella.
7—Twelfth and Fifteenth on one slide.
8—Fifteenth (No. 2).
9—Sesquialtera.
10—Trumpet.

Choir, 6 Stops—FFF to F in alt.

11—Open Diapason, throughout.
12—Stopped Diapason.
13—Dulciana.
14—Flute.
15—Principal.
16—Cremona.

Swell, 9 Stops—FF to f in alt.

17—Open Diapason.
18—Stopped Diapason.
19—Dulciana.
20—Principal.
21—Harmonica.
22—Sesquialtera, IV ranks.
23—Hautboy.
24—French Horn.
25—Clarion.

Pedal, 1 Stop.

26—Open Diapason, to FFF.

Couplers.

1—Swell to Great.
2—Octave Swell to Great.
3—Choir to Great.

264. Turvey.

The Organ in Turvey Church, Bedfordshire, is an admirable instrument, and was built by Hill, in the early part of the present year, 1855. It contains 27 Sounding Stops, of which the following is a list:

Great, 9 Stops.

1—Double Open Diapason 16 feet.
2—Open Diapason..... 8 feet.
3—Stopped Diapason .. 8 feet tone.
4—Principal ..... 4 feet.
5—Flute..... 4 feet.
6—Twelfth..... $2\frac{2}{3}$ feet.
7—Fifteenth..... 2 feet.
8—Sesquialtera, III rks.
9—Trumpet ..... 8 feet.

Swell, 8 Stops.

10—Double Diapason . . . 16 feet.
11—Open Diapason ... 8 feet.
12—Stopped Diapason... 8 feet tone.
13—Dulciana ..... 8 feet.
14—Principal..... 4 feet.
15—Fifteenth ..... 2 feet.
16—Cornopean..... 8 feet.
17—Hautboy..... 8 feet.

Choir, 6 Stops.

18—Open Diapason.... 8 feet.
19—Stopped Diapason .. 8 feet tone.
20—Salicional..... 8 feet.
21—Principal..... 4 feet.
22—Flute ..... 4 feet.
23 { Cremona..... 8 feet tone.
23 { Basooon..... 8 feet.

Solo, 1 Stop.

24—Tuba Mirabilis, on a fourth Manual..... 8 feet.

Pedal, 3 Stops.

25—Sub Bourdon ..... 32 feet tone.	27—Trombone..... 16 feet.
26—Open Diapason ..... 16 feet.	

Couplers.

1—Great to Pedal.	4—Solo to Pedal.
2—Swell to Pedal.	5—Swell to Great.
3—Choir to Pedal.	6—Tuba to Great.

Compass.

Manuals, CC to f^3 in alt, 54 notes.	Pedal, CCC to Tenor d, 27 notes.

265. Northampton.

The Organ in All Saints' Church, Northampton, is a very fine instrument. It was built by Mr. Hill, about 10 years since; a great portion of the previous Organ being used up in the new work. It contains 44 Sounding Stops, 3 Manuals, and an independent Pedal of 7 Stops. The following is a specification of the instrument as left by Mr. Hill:

Great, 16 Stops—CC to F.

1—Double Open..... 16 feet.	9—Fifteenth..... 2 feet.
2—Double Stopped throughout..... ... 16 feet.	10—Sesquialtera, III rks. $1\frac{3}{5}$ foot.
3—Open Diapason .... 8 feet.	11—Doublette .. II rks. 2 feet.
4—Open Diapason .... 8 feet.	12—Furniture,.. IV rks. $\frac{2}{3}$ foot.
5—Stopped Diapason... 8 feet.	13—Double Trumpet.... 16 feet.
6—Quint..... 6 feet.	14—Posaune..... 8 feet.
7—Principal ... . 4 feet.	15—Trumpet..... 8 feet.
8—Twelfth ..... 3 feet.	16—Clarion ..... 4 feet.

Choir, 6 Stops—CC to F.

17—Dulciana..... 8 feet.	20—Flute..... 4 feet.
18—Stopped Dulciana .. 8 feet.	21—Fifteenth..... 2 feet.
19—Principal..... 4 feet.	22—Cremona..... 8 feet.

Swell, 15 Stops—CC to F.

23—Double Diapason... 16 feet.	31—Mixture, .. II rks.
24—Open Diapason .... 8 feet.	32—Contra Fagotto .... 16 feet.
25—Stopped Diapason .. 8 feet.	33—Cornopean..... 8 feet.
26—Dulciana..... 8 feet.	34—Trumpet..... 8 feet.
27—Principal ..... 4 feet.	35—Oboe..... 8 feet.
28—Twelfth ..... 3 feet.	36—Clarion ..... 4 feet.
29—Fifteenth..... 2 feet.	37—Flute..... 4 feet.
30—Sesquialtera, III rks.	

Pedal, 7 Stops—CCC to Tenor d.

38—Open, wood ..... 16 feet.	42—Sesquialtera, V rks.
39—Sub Bass..... 16 feet.	43—Trombone..... 16 feet.
40—Principal..... 8 feet.	44—Trumpet..... 8 feet.
41—Fifteenth..... 4 feet.	
3 Pedal Couplers.	1 Manual Coupler.

266. Northampton.

The Organ in the Exchange Room, at Northampton, is the German instrument that was placed in the Great Exhibition building of 1851, by Schulze, of Paulinzelle, near Erfurt. It is an admirable Organ, and presents varieties of tone, both in regard to character and strength, quite unusual in an instrument with so few Stops. It contains 16 Sounding Stops, of which the following is a list:

Great, 8 Stops.

1—Bourdon	16 feet tone.	6—Octave	4 feet.
2—Open Diapason	8 feet.	7 { Quint and Super-octave } drawing together	2⅔ feet. 2 feet.
3—Gamba	8 feet.	8—Mixture, V ranks	2 feet.
4—Hohl-flote	8 feet.		
5—Gedact	8 feet tone.		

Choir, 6 Stops.

8—Lieblich Gedact, to Gamut G key (GG Pipe)	16 feet tone.	12—Flauto Traverso	8 feet.
10—Geigen Principal	8 feet.	13—Geigen Principal	4 feet.
11—Lieblich Gedact	8 feet tone.	14—Flauto Traverso and Lieblich Gedact, on 1 slider	4 feet.

Pedal, 2 independent Stops, and 2 by communication.

a—Sub-bass, borrowed from Manual Bourdon	16 feet tone.	b—Flute Bass, borrowed from Manual Gedact	8 ft. tone.
15—Octave Bass (wood)	8 feet.	16—Posaune, Free Reeds	16 ft. tone.

Couplers.

1—Great to Pedal	2—Choir, Sub-octave to Great.

Compass.

Great, CC to f^3 in alt.	Pedal, CCC to Tenor d.
Choir, CC to f^3 in alt.	

The Pedal Clavier is concave in section, consequently the extreme keys are much more within convenient reach than usual.

267. Rochester.

The Organ in Rochester Cathedral was built by Samuel Green. In 1835, it was considerably enlarged by Hill. It contains 24 Stops, of which the following is a list:

Great, 10 Stops.

1—Open Diapason.	6—Twelfth.
2—Open Diapason.	7—Fifteenth.
3—Stopped Diapason.	8—Sesquialtera, III ranks.
4—Claribella, in place of IV-rank Cornet.	9—Mixture II ranks.
5—Principal.	10—Trumpet.

Choir, 5 Stops.

11—Open Diapason, through, in place of Bassoon.	13—Dulciana.
12—Stopped Diapason.	14—Principal.
	15—Fifteenth.

Swell, 8 Stops.

16—Open Diapason.	20—Dulciana Principal.
17—Stopped Diapason.	21—Cornet, III ranks.
18—Dulciana.	22—Trumpet.
19—Principal.	23—Hautboy.

Pedal, 1 Stop.

24—Open Pipes, CC down to CCC.. 16 feet length.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	3—Coupler, Choir to Pedal.
2—Coupler, Great to Pedal.	4 to 7—Four Composition Pedals.

Compass.

Great, GG to e^3 in alt.	Swell, Tenor c to e^3 in alt.
Choir, GG to e^3 in alt.	Pedal Clavier, GG to Tenor d.

268. Canterbury.

It is not known who was the original builder of the Organ in Canterbury Cathedral; but it was re-built by Samuel Green, in 1784, who put in new Diapasons and enlarged the scale of the Pipes. It was removed, in 1827, from above the screen, by Longhurst, sen. In 1842, Mr. Hill enlarged the Organ, by putting in new keys and a long movement of upwards of 90 feet; he also re-built the Swell Organ, and extended the compass to Tenor c. The Organist now sits in the Choir behind the Decani Lay Clerks. The Organ, which is now placed over the south aisle, has 3 sets of keys; Compass, from GG to E; two octaves of Pedals, and one octave of Pedal Pipes from CCC to CC.

Great, 12 Stops.

1—Open Diapason.	7—Twelfth.
2—Open Diapason.	8—Sesquialtera, III ranks
3—Stopped Diapason.	9—Mixture.... II ranks.
4—Claribella, Treble, in place of V-rank Cornet.	10—Trumpet, Treble, in place of Tierce.
5—Principal.	11—Great Trumpet (throughout).
6—Fifteenth.	12—Clarion..... (throughout).

Choir, 6 Stops.

13—Stopped Diapason.	16—Open Flute.
14—Dulciana.	17—Principal.
15—Stopped Flute.	18—Cremona.

Swell, 10 Stops.

19—Stopped Diapason.	24—Twelfth.
20—Double Open Diapason.	25—Sesquialtera, III ranks.
21—Unison Open Diapason.	26—Cornopean.
22—Principal.	27—Trumpet.
23—Fifteenth.	28—Hautboy.

Pedal, 2 Stops.

29—Stopped Diapason (wood).	30—Open Diapason (wood).

Couplers.

1—Swell to Great.	2—Pedal to Great.	3—Pedal to Choir.

269. Tonbridge Wells.

The Organ in Trinity Church, Tonbridge Wells, was built by Gray, in 1840, and is a very fine one.

Great, 8 Stops—Compass, GG to F in alt.

1—Stopped Diapason.	5—Twelfth.
2—Open Diapason.	6—Fifteenth.
3—Open Diapason.	7—Sesquialtera, III ranks.
4—Principal.	8—Trumpet.

Choir, 6 Stops—GG to F in alt.

9—Stopped Diapason.	12—Fifteenth.
10—Open Diapason.	13—Flute.
11—Principal.	14—Cremona to Fiddle G.

Swell, 5 Stops—Compass, from Tenor C to F in alt.

15—Open Diapason.
16—Stopped Diapason.
17—Principal.
18—Trumpet.
19—Hautboy.

Pedal, 1 Stop.

20—Open Diapason, CC to CCC, one octave.. 16 feet length.

Coupler to Great Organ.
Four Composition Pedals.
Two Octaves and a note of German Pedals, from CCC.

270. Cranbrook.

The Organ in the Parish Church at Cranbrook, Kent, is a most excellent instrument. It was built by Mr. Willis, in 1854, and consists of two complete rows of Keys, of the Compass from CC to F in alt, fifty-four notes, and two Octaves and a half of Pedals, of the Compass CCC to F, thirty notes. It contains the following Stops:

Great, 11 Stops.

1—Double Diapason, closed wood..... 16 feet.
2—Large Open Diapason, metal..... 8 feet.
3—Small Open Diapason, metal..... 8 feet.
4—Stopped Diapason and Claribella, wood..... 8 feet.
5—Dulciana, metal..... 8 feet.
6—Flute (Harmonic) metal 4 feet.
7—Principal, metal..... 4 feet.
8—Twelfth, metal..... 3 feet.
9—Fifteenth, metal..... 2 feet.
10—Sesquialtera, V rnks. met. $1\frac{3}{5}$ foot.
11—Trumpet, metal..... 8 feet.

Swell, 10 Stops.

12—Double Diapason, closed wood..... 16 feet.
13—Open Diapason, metal.. 8 feet.
14—Stopped Diapason, wood. 8 feet.
15—Gamba (to Tenor C), met. 8 feet.
16—Principal, metal..... 4 feet.
17—Fifteenth, metal..... 2 feet.
18—Mixture, III ranks, metal
19—Contra Hautboy, metal 16 feet.
20—Hautboy, metal..... 8 feet.
21—Trumpet, metal..... 8 feet.

Pedal, 1 Stop.

22—Grand Open Diapason, wood.....16 feet.

Couplers.

1—Swell to Great.
2—Swell to Pedals.
3—Great to Pedals.

271. Chichester.

The Organ in the Cathedral at Chichester was built by Renatus Harris, in 1678, and originally had but 1 Manual; no Pedals; only one Open Diapason, which stood in the West Front of the Case, diapered and gilded; and no Reed Stop. In the year 1725, Byfield added the Choir Organ, and put a Trumpet Stop into the Great Organ. In 1773, the East Front Open Diapason was added by Knight, who at the same time built the Swell. In 1806, England considerably improved the Organ, by introducing new and larger sound-boards; at the same time making the Great and Choir Manuals long Octaves; putting a II-rank Mixture into the Great

Organ; placing a Hautboy in the room of the Swell Trumpet, and a Dulciana to Gamut G, in lieu of the Choir Cremona. The old Pipes were at the same time rounded out and repaired. For these repairs and improvements, England received 200 guineas. A Pedal Clavier, of the compass GG to Tenor c, was also laid down, by England, acting on the Bass Keys of the Great Manual. In 1829, Pilcher added a set of Unison Pedal Pipes from FFF to Tenor c, and placed a Clarabella in the Swell in the room of the IV-rank Cornet. He also put in a new Horizontal Bellows, using the old Diagonals as the two feeders, and also re-gilt the Choir front pipes. The cost was about £100. In 1844, a set of Double Open Pedal Pipes from FFFF to CC, and a separate Bellows, were added by Gray and Davison, the largest Pipes being laid horizontally at the back of the Organ, in the Organ loft. The Swell Clavier was at the same time extended to GG, communicating with and pulling down the corresponding Keys of the Choir Organ; a Clarabella Stop was inserted in place of the V-rank Cornet in the Great Organ; a Cremona was put into the Choir; a Coupler, Swell to Great, was applied; also two Composition Pedals; and the whole of the Pipes were repaired, and many much improved. The cost was £218. In 1851, the present Swell of 8 Stops was added by Hill, and the Organ now contains the following Stops:

Great, 10 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Clarabella, in place of V-rank Cornet.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera..III ranks.
9—Mixture..... II ranks.
10—Trumpet, draws in halves.

Choir, 6 Stops.

11—Dulciana to Gamut G.
12—Stopped Diapason.
13—Principal.
14—Flute.
15—Fifteenth.
16—Cremona to Fiddle g.

Swell, 8 Stops.

17—Double Diapason.
18—Open Diapason.
19—Stopped Diapason.
20—Principal.
21—Fifteenth.
22—Sesquialtera, III ranks.
23—Hautboy.
24—Cornopean.

Pedal, 2 Stops.

25—Great Open Bass, to FFFF, 24 feet.
26—Open Diapason, to FFF.. 12 feet.

Accessory Stops, &c.

1—Swell to Great.
2—Great to Pedal.
3—Choir to Pedal.
4, 5, Two Composition Pedals.

Compass.

Great, GG to d^3 in alt.
Choir, GG to d^3 in alt.
Swell, Tenor c to d^3 in alt.
Swell Clavier, GG to d^3 in alt.
Pedal, FFF to Tenor c, 20 notes.

272. Winchester.

The fine new Organ in Winchester Cathedral was built by Willis, under the direction of Dr. S. S. Wesley. It comprises 4 Manuals, an independent 32-feet Pedal of 8 Stops, and altogether 43 Sounding Stops, nearly all of which are whole Stops. The following is the scheme:

Great, 13 Stops.

1—Double Diapason	16 feet.	8—Fifteenth	2 feet.
2—Open Diapason	8 feet.	9—Sesquialtera.	
3—Open Diapason	8 feet.	10—Mixture.	
4—Stopped Diapason	8 feet tone.	11—Trombone	8 feet.
5—Principal	4 feet.	12—Trumpet	8 feet.
6—Principal	4 feet.	13—Clarion	4 feet.
7—Twelfth	$2\frac{2}{3}$ feet.		

Swell, 13 Stops.

14—Double Diapason	16 feet.	21—Sesquialtera.	
15—Open Diapason	8 feet.	22—Mixture.	
16—Stopped Diapason	8 feet tone.	23—Trumpet	16 feet.
17—Principal	4 feet.	24—Trumpet	8 feet.
18—Flute	4 feet.	25—Hautboy	8 feet.
19—Twelfth	$2\frac{2}{3}$ feet.	26—Clarion	4 feet.
20—Fifteenth	2 feet.		

Choir, 8 Stops.

27—Open Diapason	8 feet.	31—Flute	4 feet.
28—Stopped Diapason	8 feet tone.	32—Fifteenth	2 feet.
29—Dulciana	8 feet.	33—Sesquialtera.	
30—Principal	4 feet.	34—Cremona	8 feet tone.

Solo, 6 Stops.

35—Harmonic Flute	8 feet.	38—Horn	8 feet.
36—Harmonic Flute	4 feet.	39—Orchestral Hautboy	8 feet.
37—Piccolo	2 feet.	40—Corno di Bassetto	8 feet tone.

Pedal, 8 Stops.

41—Double Double Diapason	32 feet.	44—Open Diapason	8 feet.
		45—Principal	4 feet.
42—Double Open Diapason	16 feet.	46—Mixture.	
		47—Trombone	16 feet.
43—Double Dulciana	16 feet.	48—Tromba	8 feet.

Compass of all the Manuals, CC. Pedal, CCC.

Couplers.

Swell to Great.	Choir to Pedal.
Choir to Great.	Swell to Pedal.
Great to Pedal.	

273. Salisbury.

The Specification of the Organ that Harris built for Salisbury Cathedral, with its "Fifty Stops, four sets of Keys, and eleven Stops of Echos," is sufficiently curious to warrant its insertion here; particularly as it has never before been

printed. Although, according to tradition, it was a very fine instrument, yet its unusually large size was to some extent due to "show;" not made up so much by the introduction of Half or Incomplete Stops—for there were but two Stops of less than the full range in the whole Organ, if we except the Echos—as (1) from the adoption of a system of "Communication," whereby some Stops belonging to one Manual were made to act on a second, drawing separately and sounding independently, as though composed of entirely distinct sets of pipes; (2) by making every rank of the Chorus-work in the Echo draw separately; and (3) by providing three Manuals out of the four with a "Spare Stop." The custom of bringing Stops, or portions of Stops, from one Manual on to another "by Communication," as it was termed, was a favourite one with Harris. The Bass of the Open Diapason, Stopped Diapason, and Principal, of the Choir Organ at St. Mary Axe, are borrowed in this manner; and, this plan having been followed by the above-mentioned and other builders, examples still exist in the instruments at Isleworth, St. Bartholomew the Great, St. Dionis Backchurch, &c. In the particular instrument, however, under consideration, no less than *thirteen* of the fifteen Great Organ Stops were made to act after this manner, on a separate Manual, as a second Great Organ. The principle of making up an imposing-looking specification by such means, appears to have been disapproved of by the younger Harris and Byfield; for they, in their agreement for the Doncaster Organ, contracted for 23 Stops, "*without* any *communication*, or any Set of Pipes made to serve in a double capacity in or upon both Organs*." Harris's Salisbury scheme was as follows:

Great, 16 Stops.

1—Open Diapason.	8 feet.	9—Larigot.	1⅓ foot.
2—Open Diapason.	8 feet.	10—Sesquialtera, IV rnks.	
3—Stopped Diapason. . .	8 feet tone.	11—Cornet. . . . . V rnks.	8 feet tone.
4—Principal.	4 feet.	12—Trumpet.	8 feet.
5—Flute.	4 feet tone.	13—Clarion.	4 feet.
6—Twelfth.	2⅔ feet.	14—Cromhorn.	8 feet tone.
7—Fifteenth	2 feet.	15—Vox Humana.	8 feet tone.
8—Tierce.	1⅗ foot.	16—Spare Stop.	

Borrowed Great, 14 Stops.

17—Open Diapason.	8 feet.	24—Larigot.	1⅓ foot.
18—Stopped Diapason. . .	8 feet tone.	25—Sesquialtera, IV ranks.	
19—Principal.	4 feet.	26—Trumpet.	8 feet.
20—Flute.	4 feet tone.	27—Clarion.	4 feet.
21—Twelfth.	2⅔ feet.	28—Cromhorn.	8 feet tone.
22—Fifteenth.	2 feet.	29—Vox Humana.	8 feet tone.
23—Tierce.	1⅗ foot.	30—Spare Stop.	

Choir, 8 Stops.

31—Open Diapason to Gamut G.	8 feet.	35—Twelfth	2⅔ feet.
32—Stopped Diapason . .	8 feet tone.	36—Fifteenth	2 feet.
33—Principal	4 feet.	37—Bassoon	8 feet.
34—Flute	4 feet tone.	38—Spare Stop.	

* Historical Introduction, page 93.

Echo, to Middle c^1, 11 Stops.

39—Open Diapason	8 feet.	45—Tierce	$1\frac{3}{5}$ foot.
40—Stopped Diapason ..	8 feet tone.	46—Larigot	$1\frac{1}{3}$ foot.
41—Principal.....	4 feet.	47—Trumpet	8 feet.
42—Flute.....	4 feet tone.	48—Vox Humana	8 feet tone.
43—Twelfth	$2\frac{2}{3}$ feet.	49—Cromhorn	8 feet tone.
44—Fifteenth.....	2 feet.		

50—Drum Pedal, tuned to CC*.

Towards the end of the last century, the Cathedral underwent an extensive repair. While the alterations were in progress, King George the Third, who was then residing chiefly at Windsor, visited Salisbury, and, hearing that the means depended on the contributions of the gentlemen of Wiltshire and Berkshire, said to Bishop Barington, "I desire that you will accept a new Organ for your Cathedral, being my contribution as a Berkshire gentleman." The present instrument was accordingly built, by Green, in 1792, and cost 1000 guineas and the old Organ. It contains 25 Sounding Stops, of which the following is a list:

Great, 10 Stops.

1—Open Diapason.	7—Sesquialtera, III ranks.
2—Open Diapason.	8—Furniture .. II ranks.
3—Stopped Diapason.	9 { Trumpet, Bass.
4—Principal.	{ Trumpet, Treble.
5—Twelfth.	8—Cornet, V ranks to Middle c^1.
6—Fifteenth.	

Choir, 6 Stops.

11—Stopped Diapason.	14—Principal.
12—Dulciana to Tenor c.	15—Fifteenth.
13—Flute.	16—Bassoon.

Swell, 8 Stops—Compass from Gamut G to E in alt.

17—Open Diapason.	21—Trumpet.
18—Stopped Diapason.	22—Hautboy.
19—Dulciana.	23—Cornet, III ranks.
20—Principal.	24—Vox Humana.

Pedal, 1 Stop.

25—Double Diapason Pipes to FFF.

Couplers.

1—Swell to Choir.	4—Octave Coupler to the Double Diapasons.
2—Swell and Choir to Great.	
3—Pedals to Great.	

There is a tradition that part of Harris's Organ went to Abingdon Church, in Berkshire. The Choir Organ, with additions, was re-erected at Helston, in Cornwall, by Green and Blythe, where it was opened December 8, 1799.

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* The Drum Pedal was made with two Pipes, tuned at half tones from each other. There were such devices in existence, at the commencement of the present century, in the following Organs:

Christ Church, Spitalfields.... tuned to C.
St. Botolph, Aldgate ..... tuned to D.
St. John's, Wapping ..... tuned to D.
St. Nicholas, Deptford ..... tuned to D.
Abingdon, Berks.

274. Bristol.

The Organ in Bristol Cathedral was built by Renatus Harris, in 1685.

Great, 12 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Sesquialtera, IV ranks.
9—Tierce.
10—Trumpet.
11—Clarion.
12—Cornet, V ranks.

Choir, 4 Stops.

13—Open Diapason, in place of Principal.
14—Stopped Diapason.
15—Flute.
16—Fifteenth.

Swell, 6 Stops.

17—Open Diapason.
18—Stopped Diapason.
19—Principal.
20—Hautboy.
21—Trumpet.
22—Cornet, III ranks.

Pedal, 1 Stop.

23—Double Diapason Pipes, one octave.

Couplers.

1—Swell to Great.
2—Pedals to Great.
One Octave of Pedal Keys.

275. Bristol.

The Organ in St. James's Church, Bristol, was built in 1824, by Smith, of that city, under the direction of Dr. (then Mr.) Hodges. It has 4 Manuals; the Stops of one of which, however, are, "by communication," obtained from the Great Organ. The Sesquialtera in the Great Organ, and the Cornet in the Swell, are not separate Stops, but are simply connecting movements for drawing the preceding three single-ranked Stops in combination. This instrument was the first in England that had a Covered Stop on the Pedal down to CCCC, the 32-feet sound. It also presents the earliest *English* specimen of an Octave Manual Coupler. The Swell Stops and Sound-board, moreover, are continued beyond the compass of the Manual, i. e. up to c^4 in altissimo, so that the Octave Coupler operates with more than usual effect. The following is a list of the Stops:

Great, 14 Stops.

1—Open Diapason..... 8 feet.
2—Open Diapason .... 8 feet.
3—Stopped Diapason... 8 feet tone.
4—Principal ..... 4 feet.
5—Principal ..... 4 feet.
6—Twelfth..... $2\frac{2}{3}$ feet.
7—Fifteenth..... 2 feet.
8—Fifteenth ..... 2 feet.
9—Tierce..... $1\frac{1}{5}$ foot.
10—Larigot..... $1\frac{1}{3}$ foot.
11—Twenty-second .... 1 foot.
Sesquialtera, III ranks.
12—Mixture.... II ranks.
13—Trumpet ..... 8 feet.
14—Octave Bassoon .... 4 feet.

Inside Choir, 5 Stops.

Chiefly borrowed, by communication, from Great Organ.

15—Open Diapason .... 8 feet.
16—Stopped Diapason... 8 feet tone.
17—Principal ..... 4 feet.
18—Flute ..... 4 feet.
19—Clarionet ..... 8 feet tone.

Swell, 9 Stops.

20—Open Diapason .... 8 feet.
21—Stopped Diapason .. 8 feet tone.
22—Principal ..... 4 feet.
23—Twelfth ..... $2\frac{2}{3}$ feet.
24—Fifteenth ..... 2 feet.
25—Tierce ..... $1\frac{3}{5}$ foot.
Cornet, III ranks.
26—Hautboy ..... 8 feet.
27—Trumpet ..... 8 feet.
28—Cremona ..... 8 feet tone.

Pedal, 5 Stops.

29—Double Stopped Diapason ..... 32 feet tone.
30—Open Diapason .... 16 feet.
31—Stopped Diapason ... 16 feet tone.
32—Principal ..... 8 feet.
33—Bassoon ..... 16 feet.

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.
2—Coupler, Swell Octave to Great.
3—Coupler, Swell to Choir.
4—Coupler, Choir to Great.
5—Coupler, Great to Pedal.
6—Coupler, Choir to Pedal.
7 to 10—Four Wind-trunk Valves.

Compass.

Great, CC to e^3 in alt.
Choir, CC to e^3 in alt.
Inside Choir, CC to e^3 in alt.
Swell, Tenor c to c^4 in altissimo.
Pedal, CCC to Tenor c.

The dimensions of the Case are as follow; viz. height, 28 feet; width, 16 feet; depth, 10 feet; and the Choir Organ is in front.

276. Wells.

The Organ in Wells Cathedral was originally built by Father Smith, in 1664; and was re-built by Green, in 1786. An octave and a half of Pedals and Double Pedal Pipes were added by Smith, of Bristol, about the year 1830. Compass of the Great and Choir Organs, GG to e^3 in alt. The instrument contains 23 Sounding Stops, of which the following is a list:

Great, 11 Stops.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Tierce.
8—Sesquialtera, III ranks.
9—Furniture .. II ranks.
10—Trumpet.
11—Cornet .... IV ranks.

Choir, 5 Stops.

12—Stopped Diapason.
13—Dulciana.
14—Principal.
15—Flute.
16—Fifteenth.

Swell, 6 Stops.

17—Open Diapason.
18—Stopped Diapason.
19—Principal.
20—Cornet .... III ranks.
21—Trumpet.
22—Hautboy.

Pedal, 1 Stop.

23—Open Diapason, CC to GGG.. $21\frac{1}{3}$ feet length.

277. Exeter.

The Organ in Exeter Cathedral was originally built by John Loosemore, in 1665; but it has since received many improvements from Schrider, Jordan,

Micheau; also from Robson, Lincoln, and, lastly, from Gray. On the east front of the Case, along the impost, is the following inscription: "John Loosemore made this Organ, 1665." The Swell and the Treble of the Double Diapason were added by Jordan, Bridge, and Byfield, in the latter half of the last century; the Dulciana was introduced by Lincoln; and the lower part of the Swell, as well as some of the Pedal Pipes, by Gray.

Great, 11 Stops.

1—Double Diapason throughout.	7—Fifteenth.
2—Open Diapason.	8—Sesquialtera, V ranks.
3—Open Diapason.	9—Bassoon.
4—Stopped Diapason.	10—Trumpet.
5—Principal.	11—Cornet to c^1, V ranks.
6—Twelfth.	

Choir, 5 Stops.

12—Stopped Diapason.	15—Flute.
13—Dulciana to Tenor c.	16—Cremona.
14—Principal.	

Swell, 6 Stops.

17—Open Diapason.	20—Sesquialtera, III ranks.
18—Stopped Diapason.	21—Hautboy.
19—Principal.	22—Trumpet.

Pedal, 1 Stop.

23—Open Diapason to GGG .. 21⅓ feet length.

Couplers, &c.

1—Swell to Great.	4—Pedals to Choir.
2—Swell to Choir.	5—Octave Pedal.
3—Pedals to Great.	6 to 9—Four Composition Pedals.

Compass.

Great and Choir, GG to d^3 in alt.	Pedal, two octaves.
Swell, Gamut G to f^3 in alt.	

278. Ripon.

There is a fine Organ in Ripon Cathedral, built by Father Schmidt. About twenty years since, some new Stops were added by Wren and Boston, of Manchester; and, at the same time, a new Case was made to the instrument. The Organ now contains 26 Sounding Stops, of which the following is a list:

Great, 13 Stops.

1—Double Stopped Diapason.	7—Twelfth.
2—Open Diapason.	8—Fifteenth.
3—Open Diapason.	9—Tierce.
4—Open Diapason Treble, by Wren and Co. Manchester.	10—Sesquialtera.
	11—Mixture.
5—Stopped Diapason.	12—Cornet.
6—Principal.	13—Trumpet.

Choir, 5 Stops.

14—Open Diapason.	17—Principal.
15—Stopped Diapason.	18—Flute.
16—Dulciana.	

Swell, 7 Stops.

19—Open Diapason.
20—Stopped Diapason.
21—Dulciana.
22—Principal.
23—Cornet.
24—Trumpet.
25—Hautboy.

Pedal, 1 Stop.

26—Open Diapason, CC down to GGG.. 21⅓ feet length.

Couplers.

Swell to Great. | Great to Pedal. | Choir to Pedal.

279. Bangor.

The Organ in Bangor Cathedral was built by Samuel Green, in 1779. No alterations or improvements have been made, except a few pedals which pull down the keys of Great Organ, which were added by Bucher and Fleetwood, of Liverpool, in 1826.

Great, 7 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Fifteenth.
5—Sesquialtera, treble.
6—Sesquialtera, bass.
7—Trumpet.

Choir, 3 Stops.

8—Stopped Diapason. | 9—Dulciana. | 10—Principal.

Swell, 5 Stops.

11—Open Diapason.
12—Stopped Diapason.
13—Principal.
14—Hautboy.
15—Cornet.

280. St. Asaph.

The Organ in St. Asaph's Cathedral was built by Hill, in 1834. Compass, from GG. The Pedal Pipes are placed at a distance from the instrument, immediately behind the stalls, and the whole effect is considered truly magnificent, the Cathedral being so well adapted for sound. The Organ contains:

Great, 12 Stops.

1—Open Diapason (lowest notes wood).
2—Open Diapason (lowest notes metal).
3—Stopped Diapason, treble.
4—Stopped Diapason, bass.
5—Dulciana.
6—Principal.
7—Wald Flute.
8—Flute.
9—Twelfth.
10—Fifteenth.
11—Sesquialtera.
12—Trumpet.

Choir, 7 Stops.

13—Stopped Diapason, treble.
14—Stopped Diapason, bass.
15—Open Diapason.
16—Viol da Gamba.
17—Principal.
18—Suabe Flute.
19—Cremona.

Swell, 5 Stops.

20—Open Diapason.
21—Stopped Diapason.
22—Principal.
23—Trumpet.
24—Hautboy.

25—An Octave and a half of Pedals and Pedal Pipes.

Couplers.

Swell Coupler. | Pedals to Great. | Pedals to Choir.

281. St. David's.

The Organ in St. David's Cathedral was originally built by Father Schmidt, of whose workmanship (excepting the old oak case) only the Open Metal Diapason Pipes remain; the rest is the production of Mr. Lincoln, and was supplied about ten years ago. The Compass of the Great Organ is from CC to F in alt, Mr. Lincoln having added five notes to the original range, which was CC to C in alt.

Of the reeds in the Great Organ, the Posaune only is complete; but the instrument is pierced and ready for the Clarion, although there are as yet no pipes for it. There is no Choir Organ, which is a sad defect, as it is so much required in the Cathedral service.

Great, 11 Stops.

1—Double Diapason (i. e. Bourdon and Tenoroon).	7—Twelfth.
2—Open Metal Diapason (Schmidt's).	8—Fifteenth.
3—Open Wood Diapason.	9—Sesquialtera.
4—Quint.	10—Mixture.
5—Principal.	11—Posaune (very fine).
6—Wald Flute.	12—Clarion (no pipes as yet).

Swell, 9 Stops—From Tenor C.

13—Double Diapason.	18—Doublette.
14—Diapason, metal.	19—Cornopean.
15—Diapason, wood.	20—Hautboy.
16—Principal.	21—Clarion.
17—Piccolo.	

Pedal, 1 Stop.

22—Open Diapason from CCC.. 16 feet.

Couplers.

Swell to Great. | Pedals to Manuals. | Two Octaves of Pedals.

ORGANS IN SCOTLAND AND IRELAND.

282. Glasgow.

The large and fine Organ in the City Hall, Glasgow, containing fifty-five Stops, and upwards of three thousand Pipes, is, by many degrees, the most complete instrument yet erected in Scotland. Each manual has a range of five complete octaves, or sixty-one notes, extending from CC to C in alt, thus affording facility for the just execution of any known orchestral music, without the distortion, inversion, and consequently frequent mutilation, of its passages. The Pedal Clavier has a compass of two octaves and a third, and, besides being capable of connection at will with any or all of the Manuals, commands an independent Organ of its own. The general contents of the instrument are as follow:

Great, 15 Stops.

1—Bourdon.....	16 feet.	9—Ottavina	2 feet.
2—Open Diapason	8 feet.	10—Sesquialtera, III rks.	
3—Stopped Diapason...	8 feet.	11—Mixture ...III rks.	
4—Gamba	8 feet.	12—Flute Harmonique..	8 feet.
5—Octave.....	4 feet.	13—Flute Harmonique..	4 feet.
6—Piccolo.....	4 feet.	14—Posaune.....	8 feet.
7—Twelfth.....	3 feet.	15—Clarion	4 feet.
8—Fifteenth.....	2 feet.		

Swell, 16 Stops.

16—Bourdon	16 feet.	24—Flageolet	2 feet.
17—Open Diapason	8 feet.	25—Sesquialtera, III rks.	
18—Keraulophon	8 feet.	26—Mixture II rks.	
19—Stopped Diapason Bass	8 feet.	27—Contra-Fagotto	16 feet.
20—Clarionet Flute	8 feet.	28—Cornopean	8 feet.
21—Octave	4 feet.	29—Oboe	8 feet.
22—Flute	4 feet.	30—Voix-Humaine	8 feet.
23—Fifteenth	2 feet.	31—Clarion	4 feet.

Choir, 10 Stops.

32—Open Diapason (tin)	8 feet.	37—Flute	4 feet.
33—Clarionet Flute	8 feet.	38—Fifteenth	2 feet.
34—Stopped Diapason Bass	8 feet.	39—Piccolo	2 feet.
35—Salcional	8 feet.	40—Corno di Bassetto	8 feet.
36—Octave	4 feet.	41—Voix-Celeste	8 feet.

Pedal, 6 Stops.

42—Contra Bourdon	32 feet.	45—Octave	8 feet.
43—Open Diapason	16 feet.	46—Fifteenth	4 feet.
44—Bourdon	16 feet.	47—Trombone	16 feet.

Coupling Stops, &c.

48—Swell to Great Manual, Unison.	52—The Reeds and Harmonic Flutes of Great to Swell, Unison, by a Pedal.
49—Swell to Great Manual, Super-Octave.	53—Swell Manual to Pedals.
50—Swell to Great Manual, Sub-Octave.	54—Great Manual to Pedals.
51—Choir to Great Manual, Sub-Octave.	55—Choir Manual to Pedals.

There is a *tremulant* in connection with the Swell, and six composition Pedals for producing varied combinations of the Great Organ Stops, besides two for the Swell; and the Organ is further provided with the Pneumatic Lever for lightening the touch. The last four stops of the Great (the harmonic flutes and reeds) are placed on a distinct sound-board, in order that they may be supplied with air at a higher pressure than that allotted to the rest of the Great Organ; and this pressure is again increased in the three upper octaves of these Stops. Furthermore, by a peculiar mechanical arrangement, these four Stops can at pleasure be thrown out of connection with the Great Organ keys, and placed under the command of the Swell Manual.

283. Edinburgh.

The Organ in the Music Hall, at Edinburgh, is a particularly fine instrument. It was built in the year 1843, by Mr. Hill, of London, and contains 38 Sounding Stops, of which the following is a list:

Great, 14 Stops.

1—Tenoroon	16 feet.	8—Wald Flute	4 feet.
2—Bourdon, to meet No. 1	16 feet tone.	9—Duodecima	$2\frac{2}{3}$ feet.
3—Unison open	8 feet.	10—Super Octave	2 feet.
4—Unison closed, Treble	8 feet tone.	11—Sesquialtera, III rks.	$1\frac{3}{5}$ foot.
5—Unison closed, Bass	8 feet tone.	12—Mixture II rks.	$\frac{2}{3}$ foot.
6—Quint	$5\frac{1}{3}$ feet.	13—Doublette II rks.	2 feet.
7—Octave	4 feet.	14—Posaune	8 feet.

Choir, 11 Stops.

15—Claribella	8 feet.	21—Oboe Flute	4 feet.
16—Unison closed, Bass .	8 feet tone.	22—Piccolo	2 feet.
17—Salicional	8 feet.	23—Cremona	8 feet tone.
18—Viol di Gamba	8 feet.	24—Corno Flute	8 feet.
19—Closed Flute	4 feet tone.	25—Cornopean, Bass	8 feet.
20—Celestina	4 feet.		

Swell, 10 Stops.

26—Tenoroon Dulciana . .	16 feet.	31—Flageolet	2 feet.
27—Unison open	8 feet.	32—Doublette . . II ranks	2 feet.
28—Unison closed	8 feet tone.	33—Echo Cornet, IV ranks.	
29—Octave	4 feet.	34—Oboe	8 feet.
30—Suabe Flute	4 feet.	35—Cornopean	8 feet.

Pedal, 3 Stops.

36—Contra Bass, open . .	16 feet.	38—Trombone, of wood . .	16 feet.
37—Bourdon, stopped . . .	16 feet tone.		

Accessory Stops, Movements, &c.

1—Coupler, Swell to Great.	4—Coupler, Choir to Pedal.
2—Coupler, Choir to Great.	5, 6, 7—Three Composition Pedals.
3—Coupler, Great to Pedal.	

Compass.

Great, CC to f^3 in alt.	Swell, Tenor c to f^3 in alt.
Choir, CC to f^3 in alt.	Pedal, CCC to Tenor d.

The Case is 35 feet in height, and $17\frac{1}{2}$ feet in width.

284. Dublin.

The original Organ in St. Patrick's Cathedral, Dublin, was built by Renatus Harris, in 1697; in confirmation of which, the following is extracted from the Chapter book: "12th August, 1695. The Dean and Chapter agree with Renatus Harris, of London, Organ Builder, to make and set up a Double Organ for the sum of £505. In the Great Organ, Open Diapason of metal, Stop Diapason of wood, Principal of metal, Nason of wood, a great 12th of metal, 15th of metal, Sexquialtra of metal, a Mixture of metal, a Cornet of metal. In the Little Organ—a Principal of metal, Stop Diapason of wood, 15th of metal, Nason of wood, being in all 13 Stops, consisting of 800 Pipes, Sound-board, &c. &c. The Pipes of the old Organ to be removed and to allow £65 for same."

"11th March, 1697. Organ erected and examined by the several Vicars." "10 May, 1697. Further contract for additional Stops for £350, to be paid at Strongbow's Tomb, in Christ Church, on stated times named—viz. Trumpet Stop, Echo Stop, *Time Stop (?)*, entire Open Diapason, Flute of metal, Great Furniture of 3 ranks."

By whom the present Organ was rebuilt, &c. (probably by Byfield) we have no means of ascertaining; it has evidently been altered and improved of later years, by its having a Pedal Organ of two Octaves and two Notes. The Organ contains:

Great, 11 Stops, GG to F in alt.

1—Open Diapason.
2—Large Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Tierce.
8—Sesquialtera.....III ranks.
9—Furniture .... .. III ranks.
10—Cornet from Tenor C, V ranks.
11—Great Trumpet.

Choir, 4 Stops, GG to F in alt.

12—Stopped Diapason.
13—Dulciana.
14—Flute.
15—Large Principal, stopped and open, borrowed from the Great Organ by means of tubes.

Swell, 8 Stops, from Gamut G.

16—Double Diapason.
17—Open Diapason.
18—Stopped Diapason.
19—Principal.
20—Twelfth.
21—Fifteenth.
22—Hautboy.
23—Trumpet.

Pedal, 2 Stops, from CCC to E, two Octaves and two Notes.

24—Double Diapason, 16 feet.
25—Stopped Diapason, 8 feet, unison.

Couplers.

Great to Swell.
Pedals to Great.

285. Dublin.

The Organ in Christ Church Cathedral, Dublin, was originally built by Byfield, of London, in A. D. 1751, but has been altered by various builders, and numerous additions made at different times. It originally consisted of 2½ rows of keys, Great and Choir Organs, GG long octaves to d^3 in alt, Swell from fiddle g to d^3 in alt. An excellent Swell was added in 1845, from CC to F in alt. The older Organ formed a portion of the one built by Renatus Harris for the Temple Church, London. Upon the erection of the present instrument by Byfield, he took the old Organ in exchange as part of payment, which instrument was sold, after his death, for £500, for Wolverhampton Church. This Organ originally contained a Double Bassoon to the DD key (DDD Pipe), which appears to have been the first double Reed introduced into any British Organ.

Great, 10 Stops, GG to F in alt.

1—Double Open Diapason.
2—Open Diapason, No. 1
3—Open Diapason, No. 2.
4—Stopped Diapason.
5—Principal.
6—Twelfth.
7—Fifteenth.
8—Doublette, 8ve, 15th, and 22nd.
9—Sesquialtera, III ranks (useless).
10—Trumpet (entirely useless).

Choir, 5 Stops, GG to F in alt.

11—Open Diapason, from middle D upwards.
12—Dulciana.
13—Stopped Diapason.
14—Principal.
15—Flute.

Swell, 11 Stops, CC to F in alt.

16—Double Stopped Diapason.
17—Open Diapason.
18—Dulciana.
19—Stopped Diapason.
20—Principal.
21—Twelfth.
22—Fifteenth.
23—Doublette, 8ve, 15th, and 22nd.
24—Sesquialtera.
25—Oboe.
26—Trumpet.

Pedal, 2 Stops, CC to D, two Octaves and two Notes.

27—Open Diapason .... 16 feet. | 28—Principal..... 8 feet.

Coupling Actions.

Swell to Great.
Swell to Pedals.
Great to Pedals.

286. Dublin.

The greater portion of the Organ in Trinity College Chapel, Dublin, was built by Telford, of Dublin, in 1838. It occupies the case of an Organ built by Green, of London. The Choir of Green's instrument was not removed, on account of its excellence; the Swell, Great, and Pedal Organs are alone new.

Great, 8 Stops, GG to F in alt.

1—Open Diapason.
2—Open Diapason.
3—Stopped Diapason.
4—Principal.
5—Twelfth.
6—Fifteenth.
7—Sesquialtera.
8—Trumpet.

Choir, 4 Stops, GG to E in alt.

9—Stopped Diapason.
10—Dulciana.
11—Principal.
12—Fifteenth.

Swell, 9 Stops, C, 4 feet, to F in alt.

13—Double Stopped Diapason.
14—Open Diapason.
15—Dulciana.
16—Stopped Diapason.
17—Principal.
18—Principal.
19—Fifteenth.
20—Oboe.
21—Trumpet.

Pedal, 5 Stops, GG to C, Octave and a half.

22—Unison.
23—Principal.
24—Twelfth.
25—Fifteenth.
26—Trumpet.

Coupling Actions.

Swell to Great.
Great to Pedals.

287. Dublin.

The Organ in the Roman Catholic Church of St. Nicholas, Dublin, was built by Telford, of Dublin.

Great, 12 Stops, FFF to F.

1—Great Open Diapason, metal..... 8 feet.
2—Open Diapason, metal 8 feet.
3—Dulciana, open, metal 8 feet.
4—Stopped Diapason, wood 8 feet.
5—Principal, metal .... 4 feet.
6—Second Principal, metal 4 feet.
7—Twelfth, metal .... $2\frac{2}{3}$ feet.
8—Fifteenth, metal ... 2 feet.
9—Sesquialtera, III rks.
10—Mixture.... II rks.
11—Trumpet ..... 8 feet.
12—Clarion..... 4 feet.

Choir, 7 Stops, FFF to F.

13—Open Diapason, metal 8 feet.
14—Dulciana, metal.... 8 feet.
15—Stopped Diapason, wood 8 feet.
16—Principal, metal .... 4 feet.
17—Flute, wood ..... 4 feet.
18—Fifteenth, metal.... 2 feet.
19—Cremona, metal.... 8 feet.

Swell, 10 Stops, Gamut G to F.

20—Double Stopped Diapason, wood	16 feet.	25—Twelfth, metal	$2\frac{2}{3}$ feet.
21—Open Diapason, metal	8 feet.	26—Fifteenth, metal	2 feet.
22—Dulciana, metal	8 feet.	27—Sesquialtera, III rks.	
23—Stopped Diapason, wood	8 feet.	28—Trumpet	8 feet.
24—Principal, metal	4 feet.	29—Hautboy	8 feet.

Pedal, 5 Stops, FFF to F.

30—Double, open, wood	16 feet.	33—Twelfth	$2\frac{2}{3}$ feet.
31—Unison, open, metal	8 feet.	34—Fifteenth	2 feet.
32—Octave	4 feet.		

238. Dublin.

The Organ in the Roman Catholic Church of St. Francis Xavier, Gardener Street, Dublin, was built by Flight and Robson, and finished and erected by Gray and Son.

Great, 13 Stops, FFF to G in alt.

	Feet.	Pipes.		Feet.	Pipes.
1—Double Diapason, metal and wood	16	51	6—Principal metal	4	63
2—Great Open Diapason, metal	8	63	7—Twelfth metal	$2\frac{2}{3}$	63
3—Small Open Diapason, metal	8	51	8—Fifteenth metal	2	63
4—Stopped Diapason, wood	8	63	9—Twenty-second, metal	1	63
5—Quint .. metal	5	51	10—Sesquialtera, III rks. metal	1	189
			11—Mixture II rks.	1	126
			12—Trumpet metal	8	63
			13—Clarion metal	4	63

Choir, 8 Stops—FFF to G.

	Feet.	Pipes.		Feet.	Pipes.
14—Open Diapason, metal	8	63	17—Keraulophon . metal	8	44
15—Dulciana, wood and metal	8	51	18—Principal metal	4	63
16—Stopped Diapason, wood	8	63	19—Flute wood	4	51
			20—Fifteenth metal	2	63
			21—Cremona metal	8	39

Swell, 12 Stops—FF to G in alt.

	Feet.	Pipes.		Feet.	Pipes.
22—Double Stopped Diapason, bass, wood	16	51	27—Flute wood	4	51
23—Double Open Diapason, treb. metal	16	51	28—Fifteenth metal	2	51
24—Open Diapason, metal	8	51	29—Sesquialtera, III rks.		153
25—Stopped Diapason, wood	8	51	30—Cornopean metal	8	51
26—Principal, metal	4	51	31—Trumpet metal	8	51
			32—Hautboy metal	8	51
			33—Clarion metal	4	51

Pedal, 2 Stops—FFF to F.

34—Double Open Diapason, wood	16	25	35—Unison Open Diapason	8	25

Accessory Stops, Movements, &c.

1 to 8—8 Composition Pedals. | 9 to 12—4 Coupling Actions.

289. Belfast.

The Organ in the New Church of St. Malachy, Belfast, was built by Telford, of Dublin, in 1849. It has three complete Manuals, from CC to F in alt, and a Pedal, from CCC to E—two Octaves and four Notes; also 33 Sounding Stops, of which the following is a list:

Great, 13 Stops—CC to F in alt.

1—Bourdon, wood .... 16 feet.	6—Principal ....metal 4 feet.
2—Tenoroon, metal.... 16 feet.	7—Twelfth.....metal 2⅔ feet.
3—Great Open Diapason, metal..... 8 feet.	8—Fifteenth ....metal 2 feet.
	9—Doublette ....metal 1 foot.
4—Small Open Diapason, metal..... 8 feet.	10—Sesquialtera ... metal, III ranks.
	11—Mixture .....metal, II ranks.
5—Stopped Diapason, wood..... 8 feet.	12—Posaune.....metal 8 feet.
	13—Clarion .....metal 4 feet.

Choir, 7 Stops—CC to F in alt.

14—Dulciana...metal.. 8 feet.	17—Viol di Gamba, metal 8 feet.
15—Stopped Diapason, wood..... 8 feet.	18—Principal.....metal 4 feet.
	19—Wald Flute ... wood 4 feet.
16—Claribella, wood.... 8 feet.	20—Fifteenth .....metal 2 feet.

Swell, 10 Stops—CC to F in alt.

21—Double Stopped Diapason .....wood 16 feet.	26—Fifteenth ....metal 2 feet.
	27—Doublette ....metal 1 foot.
22—Open Diapason, metal 8 feet.	28—Sesquialtera, metal, III ranks.
23—Dulciana .... metal 8 feet.	29—Cornopean ....metal 8 feet.
24—Principal .... metal 4 feet.	30—Hautbois .....metal 8 feet.
25—Twelfth .....metal 2⅔ feet.	

Pedal, 3 Stops—CCC to E, 29 Notes.

31—Grand Double Open Diapason ..... 16 feet.	32—Double Trombone .. 16 feet.
	33—Unison Trombone .. 8 feet.

Couplers, &c.

1—Swell Organ to Great Manual.	4—Great Organ to Pedals.
2—Swell Organ to Choir Manual.	5 to 8—Four Composition Pedals.
3—Swell Organ to Pedals.	

The largest Pipe is 16 feet long; the smallest, ⅜ of an inch.

290. Belfast.

The Organ in St. Patrick's Roman Catholic Chapel, Belfast, was built by Gray and Son, in 1840.

Great, 10 Stops—GG to F.

1—Open Diapason.	6—Fifteenth.
2—Open Diapason.	7—Cornet..... III ranks.
3—Stopped Diapason.	8—Sesquialtera.. III ranks.
4—Principal.	9—Mixture .... II ranks.
5—Twelfth.	10—Trumpet.

Choir, 7 Stops.

11—Stopped Diapason, treble.	15—Flute.
12—Stopped Diapason, bass.	16—Claribella.
13—Dulciana.	17—Cremona.
14—Principal.	

Swell, 10 Stops—3 Octaves and a half.

18 - Open Diapason.
19—Double Diapason, treble.
20—Double Diapason, bass.
21—Stopped Diapason.
22—Principal.
23—Twelfth.
24—Fifteenth.
25—Sesquialtera.
26—Trumpet.
27—Oboe.

Pedal, 1 Stop—CCC, 2 Octaves.

28—Double Open Diapason .. 16 feet.

Couplers, &c.

1—Swell to Great Organ.
2—Choir Organ to Pedals.
3—Great Organ to Pedals.
4—Double Diapason to Pedals.
5—Coupler for combining Double Diapasons, to produce mysterious and other effects.
6 to 9—Four Composition Pedals.

291. Cashel.

The Organ in Cashel Cathedral, Tipperary, was built by Samuel Green, of London, in 1786; and, although small, is a very good one. It contains 17 Stops.

Great, 8 Stops.

1—Open Diapason.
2—Stopped Diapason.
3—Principal.
4—Twelfth.
5—Fifteenth.
6—Sesquialtera.
7—Trumpet.
8—Cornet.

Choir, 4 Stops.

9—Dulciana.
10—Stopped Diapason.
11—Principal.
12—Fifteenth.

Swell, 5 Stops.

13—Open Diapason.
14—Stopped Diapason.
15—Dulciana.
16—Principal.
17—Hautboy.

Octave and a half of Pedals.

Couplers for Great and Choir Organs.

292. Cashel.

The Organ in Cashel Roman Catholic Cathedral, Ireland, was erected, in 1846, by Bevington and Sons. It is one of the largest Organs in the South of Ireland.

Great, 11 Stops—FFF to F.

	Pipes.		Pipes.
1—Tenoroon, metal	60	8—Sesquialtera, IV ranks....	240
2—Bourdon, bass, FFFF....		9—Mixture . . .III ranks....	180
3—Open Diapason, FFF, metal	60	10—Trumpet.....	60
4—Stopped Diapason	60	11—Clarion	60
5—Principal.....	60		900
6—Twelfth.....	60		
7—Fifteenth	60		

Choir, 9 Stops.

	Pipes.		Pipes.
12—Open Diapason, FFF, metal	60	18—Fifteenth	60
13—Dulciana, FF	49	19—Clarionet.....	42
14—Stopped Diapason, treble. . .	60	20—Bassoon, bass, FFF.. ..	18
15—Stopped Diapason, bass, FFF			409
16—Principal, FFF	60		
17—Flute, FFF.....	60		

Swell, 8 Stops—Tenor C to F.

	Pipes.		Pipes.
21—Double Diapason.....	42	26—Cornet, III ranks	126
22—Open Diapason	42	27—Cornopean	42
23—Stopped Diapason	42	28—Oboe	42
24—Principal.....	42		
25—Flute, open wood.	42		420

Pedal, 1 Stop.

29—Open wood, CC to FFFF .. 24 feet.

Accessory Stops, Movements, &c.

1 to 6—Six Composition Pedals. | 7 to 10—Four Coupling Movements.

	Pipes.		Pipes.
Great Organ	900	Pedal	20
Choir	409		
Swell.....	420	Total.....1749	

293. CORK.

St. Mary's Roman Catholic Church, Cork, contains 25 Stops, of which the following is a list:

Great, 9 Stops.

1—Double Diapason, metal.	6—Twelfth.
2—Bourdon, metal.	7—Fifteenth.
3—Open Diapason.	8—Sesquialtera, III ranks.
4—Stopped Diapason.	9—Trumpet.
5—Principal.	

Choir, 7 Stops.

10—Dulciana.	14—Flute.
11—Stopped Diapason, treble.	15—Fifteenth.
12—Stopped Diapason, bass.	16—Cremona.
13—Principal.	

Swell, 7 Stops.

17—Double Diapason, wood.	21—Fifteenth.
18—Open Diapason.	22—Sesquialtera, III ranks.
19—Stopped Diapason.	23—Hautboy.
20—Principal.	

Pedal, 2 Stops.

24—Open Diapason, CCC.	25—Principal, CC.

An Octave and a half of Pedal keys.

Copulæ.

1—Pedals to Great. | 2—Pedals to Choir. | 3, 4, 5—Three Composition Pedals.

294. CLOYNE.

The Organ in Cloyne Cathedral was erected in the year 1813. The Diapasons on the Great Organ are particularly good; to the Great Organ there has been added an octave and a half of Pedals.

Great, 9 Stops.

1—Open Diapason.	6—Fifteenth.
2—Stopped Diapason.	7—Sesquialtera, half stop.
3—Principal.	8—Cornet, half stop.
4—Flute.	9—Trumpet.
5—Twelfth.	

Choir, 3 Stops.

10—Stopped Diapason. | 11—Principal. | 12—Flute.

Swell, 3 Stops.

13—Open Diapason. | 14—Principal. | 15—Trumpet.

The Cathedral of Cloyne is situated in a retired valley, within about two miles of the southern coast of the county of Cork, and twenty miles of the city, and about eight miles from Queenstown to the east. It is built in the shape of a cross; the choir part is small, and the chancel large; there is a splendid eastern window of stained glass, and two cross aisles off the chancel, formerly belonging (as private chapels) to two great families of the county, being at that time in the possession of the Roman Catholics. There is a perfect round tower, of a hundred feet high, one of the most perfect in Ireland, within about twenty feet of the walls. It is stated to have been built in the year 604, and, taking it altogether, nothing can exceed it as an ancient piece of architecture.

295. Kilkenny.

The Organ in the Cathedral Church of St. Canice, Kilkenny, was first erected in the Great Exhibition building at Dublin, and was afterwards sold to the Dean and Chapter of the above Cathedral. The Case is Gothic, handsomely carved. The Organ contains 3 rows of Keys—Great, Swell, and Choir; and Pedal, of 2 Octaves and 2 Notes.

Great, 11 Stops—CC to F in alt, 54 Notes.

	No. of Pipes.		No. of Pipes.
1—Open Diapason, No. 1	54	8—Sesquialtera, III ranks	162
2—Open Diapason, No. 2	54	9—Mixture, II ranks	108
3—Stopped Diapason }	54	10—Trumpet	54
4—Claribel }		11—Clarion	54
5—Principal	54		
6—Twelfth	54		702
7—Fifteenth	54		

Swell, 8 Stops—Tenor C to F in alt, 42 Keys.

	No. of Pipes.		No. of Pipes.
12—Double Diapason	42	17—Double Trumpet	42
13—Open Diapason	42	18—Cornopean	42
14—Stopped Diapason	42	19—Clarion	42
15—Principal	42		
16—Doublette (15, 22d)	84		378

Choir, 8 Stops—CC to F in alt, 54 Notes.

	No. of Pipes.		No. of Pipes.
20—Double Diapason, Bass—closed wood }	54	24—Viol de Gamba, Tenor c	42
21—Double Diapason, Treble—closed wood }		25—Principal, CC	54
		26—Flute, Tenor c	42
		27—Cremona, G	35
22—Stopped Diapason	54		
23—Dulciana, Tenor c	42		323

Pedal, 1 Stop—CCC to D, 27 Notes.

28—Great Open Diapason (16 feet) .. 27 Pipes.

Coupling Actions, 5.

1—Swell to Great.
2—Swell to Choir.
3—Pedals to Great.
4—Pedals to Choir.
5—Pedals to Swell.

This Organ contains 1,430 Pipes.
31 Stops.

296. Tuam.

The Organ building for Tuam Cathedral, by Bevington, will consist of:

Great, 11 Stops.

	No. of Pipes.		No. of Pipes.
1—Double Diapason.....	54	8—Sesquialtera, III ranks...	162
2—Open Diapason, No. 1....	54	9—Mixture .... II ranks...	108
3—Open Diapason, No. 2....	54	10—Trumpet.....	54
4—Stopped Diapason	54	11—Clarion	54
5—Principal.....	54		
6—Twelfth	54	Total No. of Pipes in Great Organ,	756
7—Fifteenth	54		

Choir, 8 Stops.

	No. of Pipes.		No. of Pipes.
12—Bourdon (8 feet Stopped) .	12	17—Principal.....	54
13—Double Diapason (Treble) .	42	18—Flute	42
14—Dulciana.....	42	19—Cremona.....	35
15—Stopped Diapason	54		
16—Viol di Gamba.....	42	Total No. of Pipes in Choir Organ,	323

Swell, 8 Stops—Tenor C.

	No. of Pipes		No. of Pipes.
20—Double Diapason.....	42	25—Double Trumpet.....	42
21—Open Diapason.....	42	26—Cornopean.....	42
22—Stopped Diapason	42	27—Hautboy.....	42
23—Principal.....	42		
24—Mixture, II ranks.....	84	Total No. of Pipes in Swell Organ,	378

Pedal, 3 Stops.

	No. of Pipes.		No. of Pipes.
28—Open Diapason (16 feet)..	27	30—Great Posaune (16 feet)..	27
29—Principal.....(8 feet)..	27		
		Total No. of Pipes in Pedal Organ,	81

Copulas.

1—Pedals to Great.	3—Swell to Great.
2—Pedals to Choir.	4—Swell to Choir.

3 Composition Pedals.

2 Octaves and 2 Notes (CC to D) of German Pedals.

Number of Pipes in Great Organ.....	756
Number of Pipes in Choir Organ.....	323
Number of Pipes in Swell Organ.....	378
Number of Pipes in Pedal Organ.....	81
Total Number of Pipes....	1538
Total Number of Stops ...	33
Total Number of Copulas..	4
	37

297. Newfoundland.

The Organ in St. John's Cathedral, Newfoundland, was built by Robson, in 1853. It contains 46 Sounding Stops, of which the following is a list:

Great, 16 Stops—Compass, CC to G, 56 Notes

	Feet.	Pipes.		Feet.	Pipes.
1—Double Diapason, Bass	16 tone.	56	10—Fifteenth	2	56
2—Double Diapason			11—Sesquialtera, 12—Mixture, 13—Furniture	X ranks	560
3—Open Diapason, Large	8	56	14—Contra Fagotto	16	56
4—Open Diapason	8	56	15—Posaune	8	56
5—Stopped Diapason	8 tone.	56	16—Clarion	4	56
6—Quint	6	56			
7—Principal	4	56			1232
8—Tenth	3½	56			
9—Twelfth	3	56			

Swell, 13 Stops—Compass, CC to G, 56 Notes.

	Feet.	Pipes.		Feet.	Pipes.
17—Double Diapason, Bass	16 tone.	56	24—Sesquialtera, 25—Mixture	V ranks	280
18—Double Diapason			26—Horn	8	56
19—Open Diapason	8	56	27—Oboe	8	56
20—Stopped Diapason	8 tone.	56	28—Clarion	4	56
21—Principal	4	56	29—Octave Clarion	2	56
22—Twelfth	3	56			
23—Fifteenth	2	56			840

Choir, 11 Stops—Compass, CC to G, 56 Notes.

	Feet.	Pipes.		Feet.	Pipes.
30—Dulciana	8	56	37—Piccolo	2	56
31—Viol di Gamba	8	44	38—Mixture (Dulciana Scale), III ranks		168
32—Stopped Diapason	8 tone.	56	39—Bassoon, 40—Clarionet	8 tone.	56
33—Clarabella Flute	8	44			
34—Celestina Viol	4	56			
35—Principal	4	56			648
36—Flute	4	56			

Pedal, 6 Stops—Compass, CCC to F, 30 Notes.

41—Open Diapason	16 feet.	45—Trombone	16 feet.
42—Stopped Diapason	16 feet tone.	46—Trumpet	8 feet.
43—Principal	8 feet.		136
44—Basso Flauto	8 feet tone.		

Copulas, &c.

1—Swell to Great.	3—Great to Pedals.
2—Swell to Pedals.	4—Choir to Pedals.

Summary of Stops, &c.

	Feet.	Pipes
Great	16	1232
Swell	13	840
Choir	11	648
Pedal	6	136
Copulas	4	
	50	2856

298. Boston, United States.

The following is an account of the Organ referred to on page 434, as being built by the Messrs. E. and G. Hook, for the Tremont Temple, Boston, United States. It is reprinted from the "description" circulated by the builders at the time of the opening of the instrument, in 1854.

"This instrument, which is by far the largest and the most comprehensive in this country, consists of four complete Manuals, from CC to A in alt, 58 notes, the Swell throughout, and an independent Pedal Organ from CCC to D, 27 notes. Wind is supplied by three bellows at different pressures. It contains seventy registers, comprising every variety of tone, and embracing all the novelties of the most celebrated European Organs.

"It occupies a space at the end of the Hall, 50 feet high, and 50 feet wide, and is concealed by an open-work screen. The following are the Stops in this instrument:

Great, 15 Stops.

1—Tenoroon Open Diapason.
2—Grand Open Diapason.
3—Open Diapason.
4—Melodia.
5—Stopped Diapason.
6—Grand Principal.
7—Principal.
8—Twelfth.
9—Grand Fifteenth.
10—Fifteenth.
11—Sesquialtera, II ranks.
12—Mixture . . . III ranks.
13—Furniture . . IV ranks.
14—Trumpet.
15—Clarion.

Choir, 10 Stops.

16—Open Diapason.
17—Dulciana.
18—Stopped Diapason.
19—Principal.
20—Fifteenth.
21—Mixture. . . .III ranks.
22—Hohl Flute.
23—Viol d'Amour.
24—Clarionet.
25—Bassoon.

Swell, 15 Stops.

26—Sub-Bass.
27—Double Diapason.
28—Open Diapason.
29—Viol di Gamba.
30—Stopped Diapason.
31—Principal.
32—Night Horn.
33—Twelfth.
34—Fifteenth.
35—Sesquialtera, III ranks.
36—Trumpet, Bass.
37—Trumpet, Treble.
38—Hautboy.
39—Clarion.
40—Double Trumpet.

Pedal, 10 Stops.

41—Double Bourdon . . . . 32 feet.
42—Bourdon . . . . . 16 feet.
43—Open Diapason . . wood 16 feet.
44—Open Diapason . . metal 16 feet.
45—Open Diapason . . . . . 8 feet.
46—Violoncello . . . . . 8 feet.
47—Quint . . . . . 6 feet.
48—Principal . . . . . 4 feet.
49—Trombone . . . . . 8 feet.
50—Posaune . . . . . 16 feet.

Solo, 6 Stops.

51—Horn Diapason.
52—Gamba.
53—Clarabella.
54—Wald Flute.
55—Piccolo.
56—Trumpet.

Couplers, &c.

57—Swell to Great, Unison.	64—Great to Pedals.
58—Swell to Great, Super Octaves.	65—Choir to Pedals.
59—Choir to Great, Sub-Octaves.	66—Pedal Octaves.
60—Swell to Choir, Unison.	67—Pedal Bourdon Separation.
61—Swell to Solo..Unison.	68—Pedal Open Diapason Separation.
62—Solo to Great..Unison.	69—Solo Organ Signal.
63—Swell to Pedals.	70—Bellows Signal.

"The distinguishing features of this Organ are the unusual size, compass, and effectiveness of the Swell, the complete Pedal Organ, and the Solo or Fourth Manual —the latter an uncommon thing, even in Europe. These, combined with perfect equality and finish in the voicing, and an easy and delicate touch, place the instrument far in advance of any yet built in this country, and put it at least on a level with the celebrated Organs of England and the Continent."

299. Henley-on-Thames.

The new Organ in the Church at Henley-on-Thames was built by Mr. Holdich, in 1854. It contains 36 Sounding Stops, of which the following is a list:

Great, 12 Stops.

1—Large Open Diapason	8 feet.	7—Fifteenth	2 feet.
2—Open Diapason	8 feet.	8—Tierce	1⅗ foot.
3—Clarabella Treble, and Stopped Diapason Bass	8 feet.	9—Sesquialtera	1⅓ foot.
4—Principal	4 feet.	10—Mixture	⅔ foot.
5—Flute	4 feet.	11—Trumpet	8 feet.
6—Twelfth	2⅔ feet.	12—Clarion	4 feet.

Choir, 8 Stops.

13—Dulciana	8 feet.	17—Flute	4 feet.
14—Clarabella	8 feet.	18—Fifteenth	2 feet.
15—Stopped Diapason Bass	8 feet.	19—Piccolo	2 feet.
16—Principal	4 feet.	20—Cremona	8 feet tone.

Swell, 12 Stops.

21—Double Diapason	16 feet.	27—Fifteenth	2 feet.
22—Bourdon	16 feet.	28—Tierce	1⅗ foot.
23—Open Diapason	8 feet.	29—Sesquialtera	1⅓ foot.
24—Stopped Diapason	8 feet.	30—Double Trumpet	16 feet.
25—Viol di Gamba	8 feet.	31—Cornopean	8 feet.
26—Principal	4 feet.	32—Hautboy Diaocton.	8 feet.

Pedal, 4 Stops.

33—Grand Double Diapason	16 feet.	35—Grand Principal	8 feet.
34—Grand Bourdon	16 feet.	36—Grand Trombone	16 feet.

Compass.

Manuals, CC to f^3 in alt.	Pedal, down to CCC.

300. Carlisle.

A new Organ has just been ordered for Carlisle Cathedral, which is to be erected in its place of destination by next November. It is to contain 3 Manuals: viz. Great, Swell, and Choir, each having a Compass of 4 Octaves and a half, from CC to G in alt, and a Pedal Board containing 30 Notes, or 2 Octaves and a half, from

CCC to F; and all the Registers are to extend throughout the entire Compass of the Key Boards, without an exception.

Mr. W. T. Best has kindly assisted Mr. Ford, the Organist to the Cathedral, in preparing the Specification for the Instrument, which will be built by Mr. Willis.

The Instrument, which will be tuned on the principle of equal temperament, is to possess 35 Registers, independently of the Couplers—5 in number—and 2,338 Pipes; and will be supplied with the Pneumatic Lever, and Pneumatic Combination Movement, together with every other modern Mechanical Improvement.

The following is a list of the Stops the Carlisle Organ is to contain:

Great, 11 Stops.

1—Double Open Diapason, metal	16 feet.	7—Sesquialtera, V ranks, metal	
2—Open Diapason	8 feet.	8—Furniture.. III ranks, metal	
3—Stopped Diapason, wood	8 feet.		
4—Principal .....metal	4 feet.	9—Trombone .....metal	8 feet.
5—Twelfth .....metal	3 feet.	10—Trumpet .....metal	8 feet.
6—Fifteenth .....metal	2 feet.	11—Clarion .....metal	4 feet.

Swell, 11 Stops.

12—Double Dulciana, metal	16 feet.	the remaining four of metal.	
13—Open Diapason ..metal	8 feet.		
14—Stopped Diapason, wood	8 feet.	18—Contra Fagotto ...wood	16 feet.
15—Principal.. .....metal	4 feet.	19—Horn .....metal	8 feet.
16—Flageolet.....wood	2 feet.	20—Oboe .....metal	8 feet.
17—Echo Cornet, V ranks, lowest rank of wood,		21—Clarion .....metal	4 feet.
		22—Vox Humana ...metal	8 feet.

The Swell to possess, in addition, a Tremulant of the improved modern construction, as patented by Willis.

Choir, 6 Stops.

23—Open Diapason ..metal	8 feet.	26—Gamba.....metal	8 feet.
24—Claribella.....wood	8 feet.	27—Harmonic Flute..metal	4 feet.
25—Dulciana.....metal	8 feet.	28—Clarionette.....metal	8 feet.

Pedal, 7 Stops.

29—Open Diapason...wood	16 feet.	33—Fifteenth.....metal	4 feet.
30—Violon .....metal	16 feet.	34—Trombone .....metal	16 feet.
31—Bourdon .....wood	16 feet.	35—Trumpet.....metal	8 feet.
32—Principal.....metal	8 feet.		

Couplers.

Swell to Great—Choir to Great—Pedal to Great—Pedal to Swell—Pedal to Choir.

Summary.

	No. of Registers.		No. of Pipes.
Great.....	11	Great	952
Swell.....	11	Swell	840
Choir	6	Choir	336
Pedal	7	Pedal	210
	35		2338

END OF THE APPENDIX.

ADDENDA.

Page.

1. THE excellent old custom mentioned in the second paragraph, of placing the Choir Organ in a second Case "in front," has been revived in the instances of the New Organs recently erected in the Churches of St. James's, Piccadilly, and St. Martin's in the Fields, London, with very picturesque effect.

9. After Sec. 33. This refers to their method of operation when a few Stops only are being used; but when the full Organ is employed, two or three Bellows will sometimes supply wind and be collapsing simultaneously.

18. The average "rise" of a reservoir, whether of large or small dimensions, is 10 inches, beyond which height it is not usually made to ascend; for, inasmuch as an increased *demand* for wind must call for an increased *supply* of the same, the *feeder-surface* is generally enlarged with the capacity of the reservoir; in other words, a larger Bellows altogether is, under such circumstances, provided, as being in every way preferable.

41. Fig. 49. In this and the two following wood-cuts the Pipes are represented as being arranged in a single row, for the sake of distinctness; though, in reality, they are more frequently planted in double rows.

43. After Sec. 186. When, however, the Swell Reeds are numerous, it is not an uncommon arrangement to place half their number in front and the remainder at the back.

47. After Sec. 203. The Organ in the Abbey Church at Selby, with two Manuals, has the Swell below and the Great Organ operating upon the upper row of keys.

68. After Sec. 296. The Organ in the Parish Church at Great Yarmouth, built by Jordan, in 1733, possessed the rare advantage (for the period) of a Tenor c Swell; while that in the Church of St. Mary, Redcliff, Bristol (by Harris and Byfield), had originally a Gamut G Swell; which, however, was afterwards reduced in compass to Fiddle g. It would perhaps be difficult, at this distance of time, to ascertain what might have been the cause which led to this alteration in the wrong direction (unless, indeed, the *box* that enclosed the Pipes was too small); but it has its parallel in the fact, that, in the North of England, a Finger Organ has recently been removed from a Church to make way for a "Grinder."

75. After Sec. 317. Another species of spotted metal, which, however, must not be classed with that described on page 75, has been produced, containing scarcely any admixture of tin; but it is easily detected by the spots not *projecting* from the mass, but rather appearing as *stains* upon it, and from the whole lacking the bright silvery whiteness that distinguishes the good spotted metal.

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85. After Sec. 365. In consequence of the word "Rohr" or reed being applied by German Organ-builders in the way mentioned on page 85, the Reed Stops are not unfrequently distinguished by the name of *Tongue* Stops.

113. After Sec. 516. The first Double Dulciana was made by the late Mr. Bishop, and forms part of the Organ erected by that builder in the new Church in Acre Lane, Clapham, about the year 1828.

115. After Sec. 527. The Dulciana was certainly *not* invented by Snetzler, but simply introduced by that builder into this country. The Cathedral Organ at Passau contains a Stop of the kind that was made by Snetzler previously to his leaving Germany for England, and which is thus incidentally mentioned by Burney, in his "Tour," vol. i, p. 187.

"M. Snetzler made some of the front Pipes; he likewise made the Vox Humana and octave *Dulciana* in the little Organ, which are the two best solo Stops that the instrument contains."

A Pedal Dulciana, of 16 feet, forms a portion of the new Organ recently erected in Winchester Cathedral, by Willis.

123. After Sec. 594. The Cornopean Stop was invented by Hill, the first specimen being introduced into an Organ built for — Fraser, Esq. of Manchester.

169. Since the Chapter on "musical pitch" was printed off, the writer has had an opportunity of carefully trying the Organ in the Chapel of Hampton Court Palace, one of Father Smith's most interesting instruments yet remaining, the Pipes of which have never undergone transposition. On testing the pitch of that Organ by the same fork that had been used for a similar purpose abroad, it was found to be rather above the fork; which latter being a little below the mathematical pitch, would make Smith's pitch to be as nearly as possible correct.

195. After Sec. 854. Although CC Manual Organs were occasionally made in England soon after the commencement of the present century—the Chamber Organ belonging to the late Samuel Wesley, built by Elliott, being an example—yet the present general recognition of that range is mainly due to the exertions of Dr. Gauntlett, who, ably backed by Mr. Hill, consistently recommended its adoption, about fifteen years since, amid great opposition. The present prevalent feeling in favour of a separate Pedal Organ, instead of a lengthened Manual, is also in a great measure due to the same influence.

255. After Sec. 1079. The Mixture-work in the Newcastle-on-Tyne Organ, mentioned in the text as including an *Open Diapason* rank in the Treble, and which was made as long back as the year 1676, is of the following composition:

NEWCASTLE-ON-TYNE MIXTURES, BY HARRIS.

	Tierce.	Sesquialtera, II ranks.	Mixture, III ranks.
CC	17	19—22	24—26—29.
Middle $c^1\sharp$	17	19—22	17—24—26.
Middle d^1	17	19—22	15—17—24.
Middle a^1	17	1— 8	15—17—24.
Treble d^2	17	1— 8	12—15—17.

The Chorus-Stops of the Organ at St. Peter Mancroft, Norwich, by the same builder, included, according to the account prepared by the late Wm. Russell, about the commencement of the present century, *two* Open Diapasons, *two* Principals, and *a Quint*. The following is the scheme given:

ST. PETER MANCROFT MIXTURES, BY HARRIS.

	Tierce.	Larigot.	Ses. III r.	Mix. II r.	Fur. III r.
CC	17	19	19—22—26	29—33	22—26—29.
FF♯	17	19	19—22—26	29—33	15—19—22.
Tenor c♯	17	19	12—15—19	22—26	15—19—22.
Tenor f♯	17	19	12—15—19	22—26	8—12—15.
Middle c^1♯	17	19	8—12—15	19—22	8—12—15.
Middle f^1♯	17	19	8—12—15	19—22	1— 8—12.
Treble c^2♯	17	19	1— 5— 8	15—19	1— 8—12.

Snetzler also incorporated an Open Diapason rank in the Treble of his Mixtures at Halifax, as already stated in the text. The Composition he adopted was as follows:

HALIFAX MIXTURES, BY SNETZLER.

	Sesquialtera, IV ranks.	Furniture, III ranks.
CC	15—17—19—22	22—26—29.
Tenor c	15—17—19—22	15—19—22.
Middle c^1	8—12—15—17	15—19—22.
Middle g^1	8—12—15—17	8—12—15.
g^3 in alt	1— 8—12—15	8—12—15.

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257. Sec. 1086, fifth line, after "vocabulary." The terms "Quart-de-Nasard, Quinta Decima," &c. present examples of *single* ranked Stops being named from the sound they produce as compared with that of other *deduced* Stops, rather than as calculated from the fundamental pitch.

259. Sec. 1090, ninth line, after "invaluable." The increasing pressure system for augmenting the power of the Treble of Reed and other Stops has recently met with an able advocate in Mr. Henry Smart, at whose recommendation a few examples of Stops voiced upon this principle have already been produced in this country by Mr. Davison. Mr. Smart has also laboured successfully to secure the introduction of several other French novelties.

273. Sec. 1160, after seventh line. Sometimes the old builders would fasten the feet of their larger wood Pipes into one of the angles of the block, instead of in the centre, rather than groove the Pipe off; but this rendered the Pipes top-heavy and very unsafe.

303 After Sec. 1258. The acoustical illusion referred to is seldom so successful in the upper part of the Pedal range (i. e. from CC upwards) as in the lower; hence it would be an advantage to have a Coupler to attach the CC key of some Manual having a Double Stop to the CC Pedal,—following the same system of union thence upwards,—which would have the effect of bringing a 32-feet ground-tone on to the upper part of the Pedal range. As the omission of a Pedal Stop, of the size of tone just mentioned, is felt even

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more in the upper part of the Pedal compass than in the lower, a Coupler of the kind proposed would be attended by a good result in all cases where a 32-feet sounding Stop does not actually exist on the department in question.

318. The Organ in the old Church at Amsterdam is a very old one indeed. The name of the builder is not known, but is supposed to be Christian Fater, of Amsterdam.

334. The Organ in St. Sulpice, at Paris, was built by Clicquot, in 1781, and originally cost 86,450 francs; the repairs and additions, up to 1846, costing 60,000 francs more; making a total of 146,450 francs, or about £5850 of our money. In 1845, the Organ was re-modelled by Cavaillé, at which time Barker's Pneumatic Lever was introduced. The old Bellows were also removed, and four grand reservoirs, with three smaller, substituted; supplied by one single and two double feeders, put in motion by three bellows-handles; and the Organ is now supplied with wind at three different pressures, namely, 6 inches, 3 inches and 3 lines, and 3 inches. The Trumpet in the Swell (Recit.), on a strong wind, is in a *separate* box placed in front, just above the Organist. The compass of the Manuals is from AA to f^3 in alt, 57 keys; the Pedal range being from CCC to Tenor d, 27 keys. At the commencement of the present year, Mons. Ducroquet inserted in the Great Organ a "Flute à Pavillon de 8 Pieds," in place of the Nazard; and a "Keraulophon de 8 Pieds," instead of the Tierce. The following are "Pèdales de combinaison:"

1—Great to Pedal.
2—Positif to Great.
3—Bombarde to Great.
4—Recit. to Great.
5—Tremulant Pedal.
6—Swell Pedal.
7—Swell Pedal to Trumpet on strong wind.

For many of the above particulars relating to the St. Sulpice Organ, the writer is indebted to the courtesy of G. T. Chambers, Esq. of Paris.

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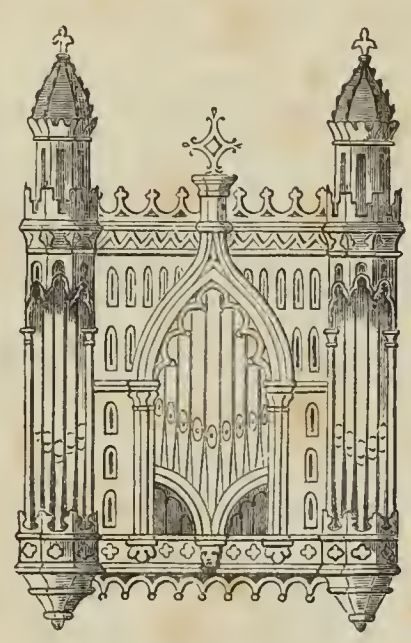

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———	Behold the Lamb of God	Four Voices.
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———	How beautiful upon the mountains	Four Voices.
———	How beautiful upon the mountains	Three Voices.
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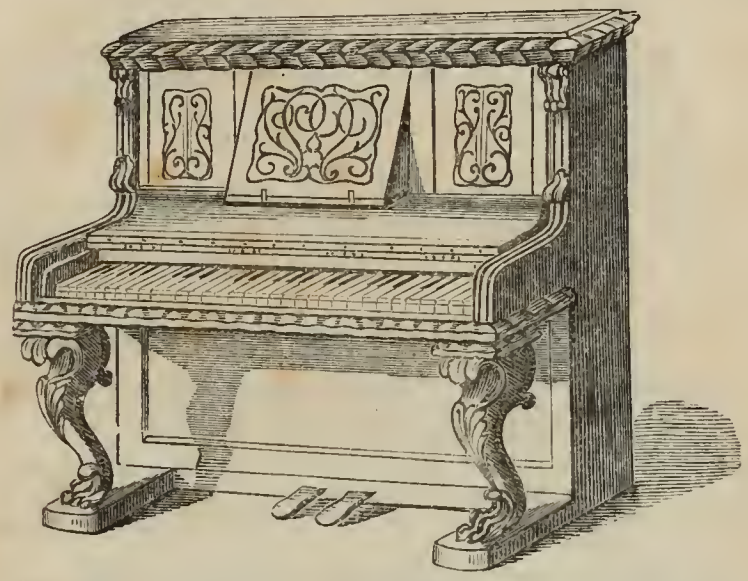

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